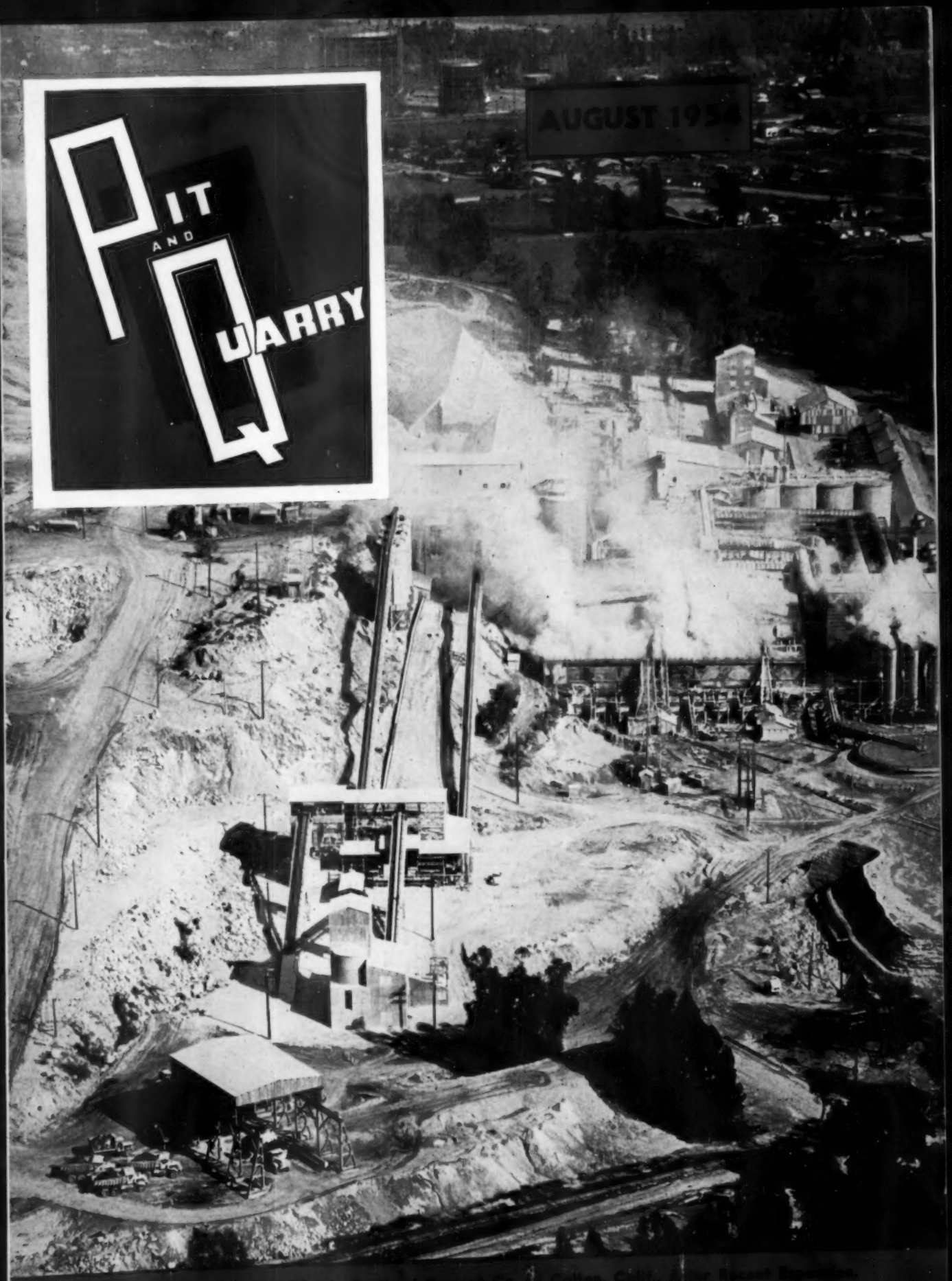
PIT AND QUARRY

AUGUST 1954



Plant and Quarry of California Portland Cement Co. at Colton, Calif., After Recent Expansion.

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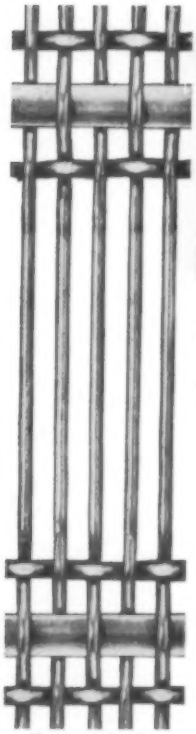
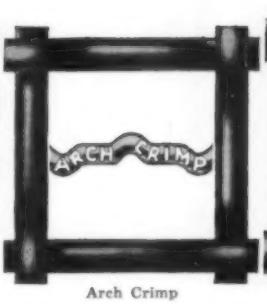
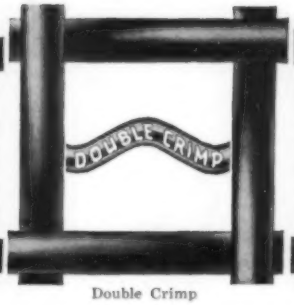


No. 5404 Sta-Tru



Arch Crimp



Double Crimp

Sta-Smooth

Arch Crimp Rek-Tang

SUPER-LOY

SQUARE OPENING and LONG OPENING WOVEN WIRE SCREENS

withstand abrasion endure vibration

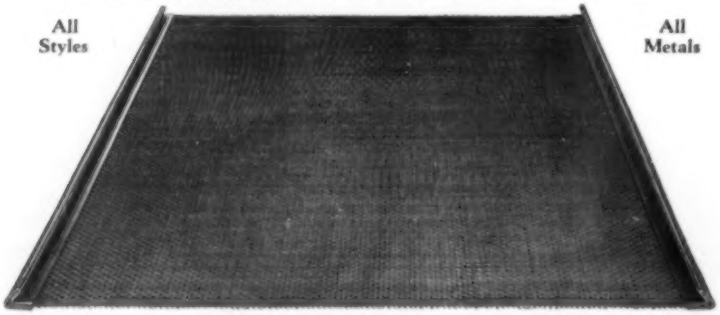
resist fatigue

— o —

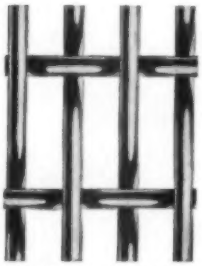
HOOK STRIPS FOR VIBRATING SCREENS

All Styles

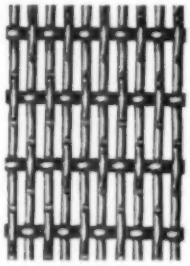
All Metals



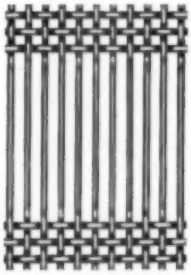
Write for catalog listing square-opening screens and wire cloth carried in stock, and showing full information for ordering special requirements made up to your exact specifications.



Sta-Smooth Rek-Tang

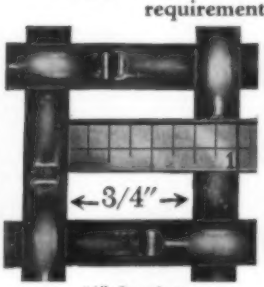


No. 95 Rek-Tang

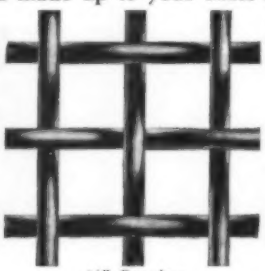


No. 7159 Sta-Clear

No. 7110 Sta-Clear

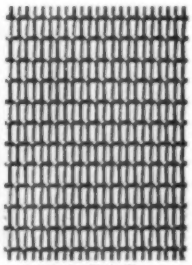


¾" Opening



⅜" Opening

½" Opening



No. 221 Rek-Tang

LUDLOW-SAYLOR WIRE CLOTH COMPANY

601 South Newstead Ave., St. Louis 10, Mo.

BIRMINGHAM, ALABAMA
921 EUCLID AVE.

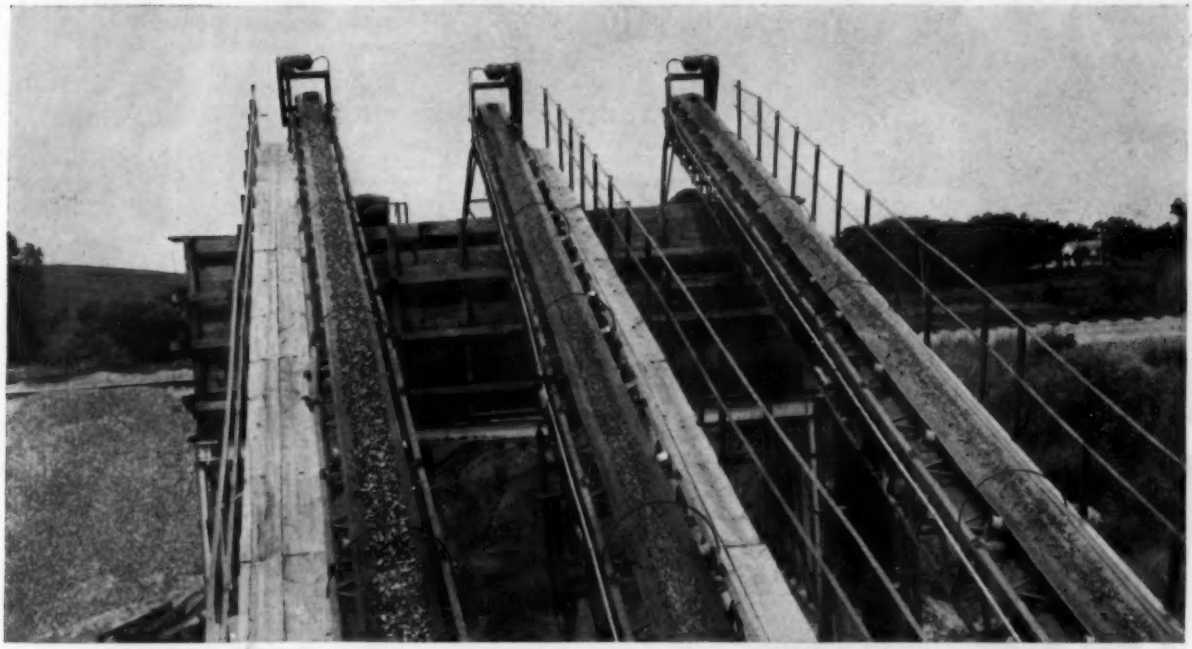
CHICAGO 39, ILLINOIS
5807 W. DIVERSEY AVE.

PITTSBURGH 19, PENNA.
UNION TRUST BLDG.

STAR WIRE SCREEN & IRON WORKS, INC., 2515 SAN FERNANDO ROAD, LOS ANGELES 65, CALIF., SUBSIDIARY

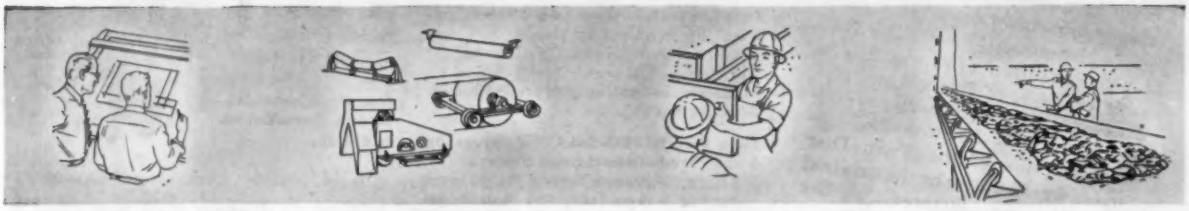
BEAT HIGH TRANSPORTATION COSTS--

carry the load via belt conveyors



Three inclined, Link-Belt belt conveyors carrying sized material and waste to truck loading bins at gravel plant.

LINK-BELT offers you the "total engineering" so necessary for top efficiency



DESIGNED FOR OVERALL EFFICIENCY

Because of its unrivalled experience, Link-Belt can do a better job of gathering and analyzing all data. Proposals reflect this understanding of the most practical way to fit conveyors into your system requirements.

BUILT FOR LONG-LIFE PERFORMANCE

Link-Belt manufactures all components and related feeders and conveyors. You are assured of the right equipment because of this breadth of line. And Link-Belt will supply the highest grade belts engineered to the job.

DELIVERS FULL RATED CAPACITY

Link-Belt follows through on every detail of the job, including electrical controls and even wiring and foundations. What's more, Link-Belt will furnish experienced erection superintendents, staffs and skilled crews.

ASSURES SATISFACTORY PERFORMANCE

When you rely on Link-Belt as a single source for your complete system, Link-Belt accepts responsibility for placing it in full operating readiness. We will also supervise modernization of existing systems.

Next time you're in the market for one belt conveyor or a complete system, call a conveying expert in the Link-Belt office near you. It's his job to help you get the best in belt conveying at the lowest possible overall cost.

LINK-BELT

BELT CONVEYOR EQUIPMENT

LINK-BELT COMPANY: Executive Offices, 307 N. Michigan Ave., Chicago 1. To Serve Industry There Are Link-Belt Plants and Sales Offices in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World.

13,350-B

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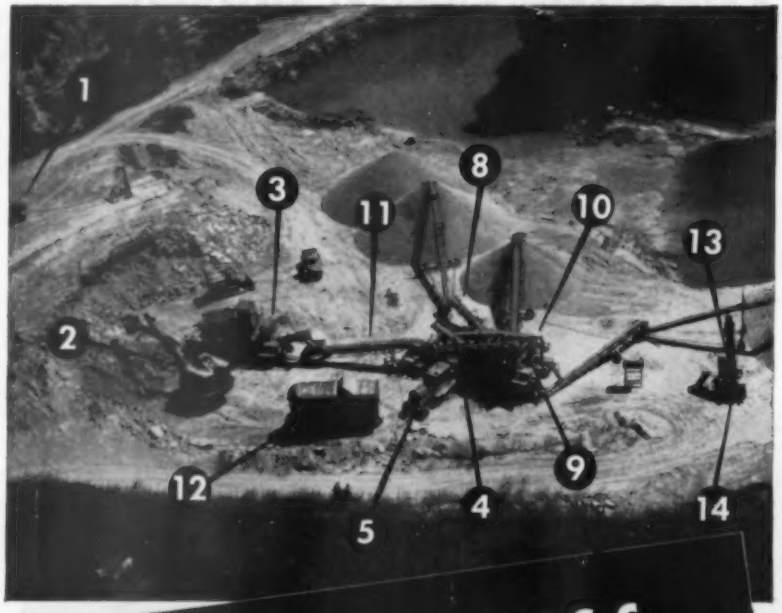


TWIN DISC 14 Drives in action!

Typical example of powered equipment in modern industry is Stoneridge Limestone Company's aggregates plant near Rochelle, Ill. And typical example of Twin Disc's *complete range* of Friction and Hydraulic Drives is the aerial photograph above of the Stoneridge operation. Nine of the Twin Disc Drives were built-in by the original equipment manufacturer . . . five were installed by Stoneridge.

Whether built-in or added for extra performance, Twin Disc Drives have the *right design, construction and capacity.* See your Authorized Twin Disc Hydraulic Dealer.

And here they are . . . count 'em!

Twin Disc Spring-Loaded Clutch on International-powered LeRoi Compressor (1).

Twin Disc Friction Power Take-Offs on Cummins-powered Bay City Shovel (2); Caterpillar-powered Universal Jaw Crusher (3) and Universal Hammer Mill (4); and on Minneapolis-Moline-powered Pioneer Roll Crusher (5).

Twin Disc HYDRO-SHEAVE® Drives on Stoneridge-built horizontal conveyor (8); Simplicity Vibrating Screen (9); Pioneer Vibrating Screen (10); and Stoneridge-built Conveyor (11).

Twin Disc Hydraulic Coupling on Hercules-powered generator plant (12).

Twin Disc Friction Clutches (two each) on Nelson P-10 Loader (6, 7; not shown); and Nelson P-11 Loader (13, 14).

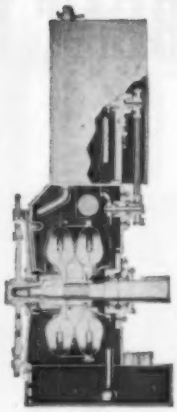
TWIN DISC
CLUTCHES AND HYDRAULIC DRIVES

TWIN DISC

TWIN DISC CLUTCH COMPANY, Racine, Wisconsin • HYDRAULIC DIVISION, Rockford, Illinois

Branches or Sales Engineering Offices: Cleveland • Dallas • Detroit • Los Angeles • Newark • New Orleans • Seattle • Tulsa

Model HUD Disconnecting Fluid Power Take-Off

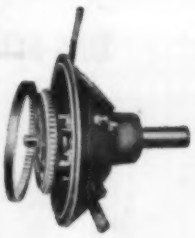


For heavy-duty installations requiring quick, positive disconnect of power source from driven equipment. Eliminates master clutch. Provides more effective use of engine torque; reduces impact shocks 70% or more. Sizes 21 and 27.

Fluid Power Take-Off

Replaces mechanical drive with smooth, cushioned power—eliminating lugging and stalling, vibrations and torsional variations. Delivers full output torque. Sizes 14.5, 17.5, 21 and 27—for all types engines up to 700 hp.

Friction Power Take-Off



Designed with actual torque capacity far in excess of rated horsepower capacity. Clutch sizes range from 6.5" to 24" single-plate; 11.5" to 24" double-plate. Housing sizes from No. 6 SAE to No. 00 SAE. Capacities up to 650 hp.

Heavy Duty Models CL and EH Friction Clutches

Incorporate every feature that can be built into a clutch to assure ruggedness. Provide easy engagement and disengagement, maximum performance, and minimum overall dimensions. Fully enclosed for protection against dust and dirt. Single-point adjustment. Gear tooth drive supplied for easy assembly. Readily attachable driving rings available for use with flywheels, drums and pulleys. CL sizes from 5.5" to 11.5"; request Bulletin 120-D. EH sizes from 14" to 42"; request Bulletin 108-F.

IT PIERCES ROCK AT 25 ft./hr.

and only EMERALD CORD Hose stands the pace

GOODYEAR INDUSTRIAL PRODUCTS
G.T.M.-Specified
EMERALD CORD HOSE
A Nonporous, nonflaking, oil-resistant synthetic tube
B Horizontal-braided, "Adhezo"-impregnated, high-strength cord for thinner walls, greater adhesion, extreme flexibility
C Super-tough, nongouging, green cover

SUSPENSION BLOWPIPE JET PIERCING MACHINE burns its way through granites, taconites, quartzites, dolomites and similar rock at 20 to 30 feet per hour. Note hose following the burner right down the hole. Photos courtesy Linde Air Products Company.

Emerald Cord—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

THIS machine literally burns blast holes into solid rock at 15 to 20 times normal drilling speed. Its white hot flame—well over 3000° F.—creates great thermal stresses that crumble the rock into fine particles. Water, also used to cool the burner, is ejected into the hole, turns to steam and blows these particles to the surface.

Big problem for designers was getting the kerosene, oxygen and water down to the blowpipe. Hose was the only answer. But every one they tried failed in a day, or less, from the rugged combination of steam, fuel, oxygen and severe abrasion by sometimes red-hot rock particles.

Their troubles ended, however, when the G.T.M.—Goodyear Technical Man—recommended EMERALD CORD Hose. This super-tough, horizontal-braided, "Adhezo"-bonded hose takes the rough treatment in stride—lasts for months—is now part of the specifications. For similar help on hose, see your Goodyear Distributor and the G.T.M., or write Goodyear, Industrial Products Division, Akron 16, Ohio.

YOUR GOODYEAR DISTRIBUTOR *can quickly supply you with Hose, Flat Belts, V-Belts, Packing or Rolls. Look for him in the Yellow Pages of your Telephone Directory under "Rubber Products" or "Rubber Goods."*

GOODYEAR

THE GREATEST NAME IN RUBBER

We think you'll like THE GOODYEAR TELEVISION PLAYHOUSE—every other Sunday—NBC TV Network

PRECO *Back-Rippers*

RIP THIS TOUGH SHALE...

FOR FAST DOZING!

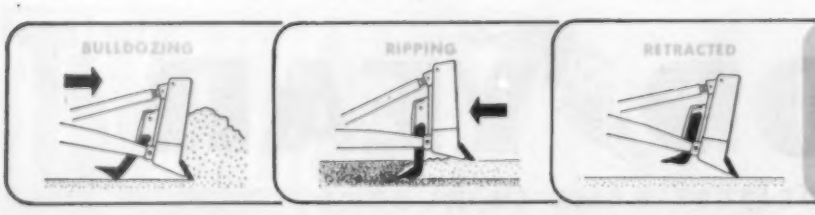
This tough layer of shale three to eighteen inches thick, in the limestone mine of the Louisville Crushed Stone Co., has been licked by Preco Back-Rippers.

Formerly it was a long, slow process for this Kentucky firm to break it up with drills, then shovel it out of the way to reach the limestone.

With Preco Back-Rippers attached to the bulldozer on a Caterpillar D8 Tractor they now rip out the shale as the tractor backs up... then doze it into a pile on the forward trip.

Wherever bulldozing is tough—in ledge rock, hardpan, cemented gravel, decomposed granite, slate or flint rock—Preco Back-Rippers break it out while the tractor is dead-heading on the back-up trip... enabling the operator to make a full load on each forward pass.

For complete information ask your "Caterpillar" dealer.



PRECO
INCORPORATED
6300 E. SLAUSON AVE., LOS ANGELES 22
CABLE ADDRESS: PRELA

Preco Back-Rippers are available for "Caterpillar" models including straight blade, angling blade and U-blade bulldozers.

Here's a team that's hard to beat for trouble-free, economical operation;

Gulf Quality Lubricants and Fuels

Whatever your activity — whether it's quarrying, crushing, processing, or hauling —Gulf lubricants and fuels will help contribute to a smoother over-all operation with lower maintenance costs.

Use Gulf lubricating oils and greases to insure an extra margin of protection for every gear and bearing in your equipment. They will provide a tough and stable film that prevents excessive wear and cuts maintenance costs. Gulf motor oils help prevent the formation of rust, sludge, and varnish—engines use less oil and require fewer overhauls.

Gulf gasoline and Diesel fuel burn evenly and completely—insure full power and smooth engine performance.

And remember too that Gulf provides excellent engineering service to make sure that the most suitable lubricants and fuels are used for every unit and climatic condition.

Contact your nearest Gulf office today and let us discuss with you how Gulf products and fine service can help your operation.

Gulf Oil Corporation · Gulf Refining Company

1822 GULF BUILDING, PITTSBURGH 30, PA.

GULF

dependability goes deep

IN THE TRAYLOR TC GYRATORY

This cutaway reveals some of the inner reasons for the dependability of a Traylor TC Gyratory, even in the most rugged service. Look at the heavy cross sections, the self-tightening bell head and curved concaves, the strong sturdy main shaft. It's no wonder the Traylor TC Gyratory is famous for dependability the world over. Its dependability is built in . . . from the inside out. That's why you should look into a Traylor TC Gyratory, now.

BULLETIN *gives all the facts*

A **Traylor** LEADS TO GREATER PROFITS

TRAYLOR ENGINEERING & MANUFACTURING CO.
676 MILL ST., ALLENTOWN, PA.
SALES OFFICES: New York • Chicago • San Francisco
CANADIAN MFRS: Canadian Vickers, Ltd., Montreal, P. Q.

DEPENDABILITY is essential in my crushing operations. I want to know more about the Traylor TC Gyratory.

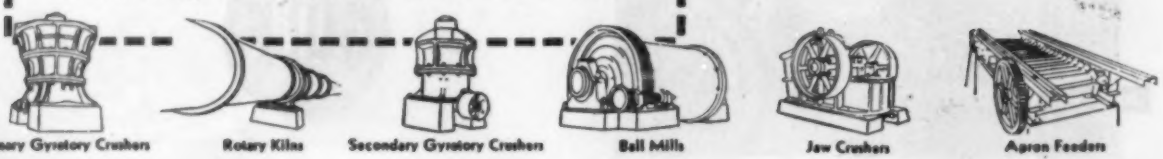
*Name*_____

*Company*_____

*Address*_____

I am crushing ____ *tons per hour with a* ____ *crusher.*

built in 7 sizes
20" to 60"
feed opening



Primary Gyratory Crushers | Rotary Kilns | Secondary Gyratory Crushers | Ball Mills | Jaw Crushers | Apron Feeders

LOOK what they're saying about

ANACONDA SECURITYFLEX* SHOVEL CABLE

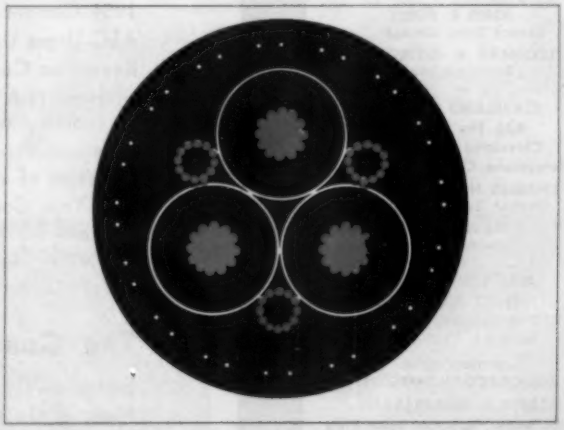
GENERAL MANAGER:
"This cable saves us money . . . there are far fewer breaks . . . and far fewer shorts from ground wires."

MINE ENGINEER:
"No matter how we run it over rocks, it holds up well. It must be the jacket. It wears like iron."

MINE FOREMAN:
"Securityflex sure is flexible . . . mighty easy to handle, too . . . the toughest cable we've ever used."

MINE SUPERINTENDENT:
"Our men can splice Securityflex easily and in less time. That saves us on down-time."

These are the things Anaconda salesmen hear daily about Securityflex Type SH-D Shovel Cable. Why not see *your* Anaconda Sales Office or Distributor for full information about this cable? *Anaconda Wire & Cable Co., 25 Broadway, New York 4, N. Y.* *Trade Mark 54288



AND THE REASON USERS CAN SAY THIS IS BECAUSE:

- **New BUTYL INSULATION provides better resistance to heat, moisture and damage by compression**
- **New NEOPRENE JACKET is tougher and more abrasion resistant**
- **RUBBER CORES cushion the ground wires . . . help prevent broken wires**
- **New COPPER-COTTON SHIELD is easier to splice**

the right cable for the job

ANACONDA®

WIRE AND CABLE

VOL. 47 AUGUST 1954 No. 2

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PIT AND QUARRY IS INDEXED IN THE ENGINEERING INDEX

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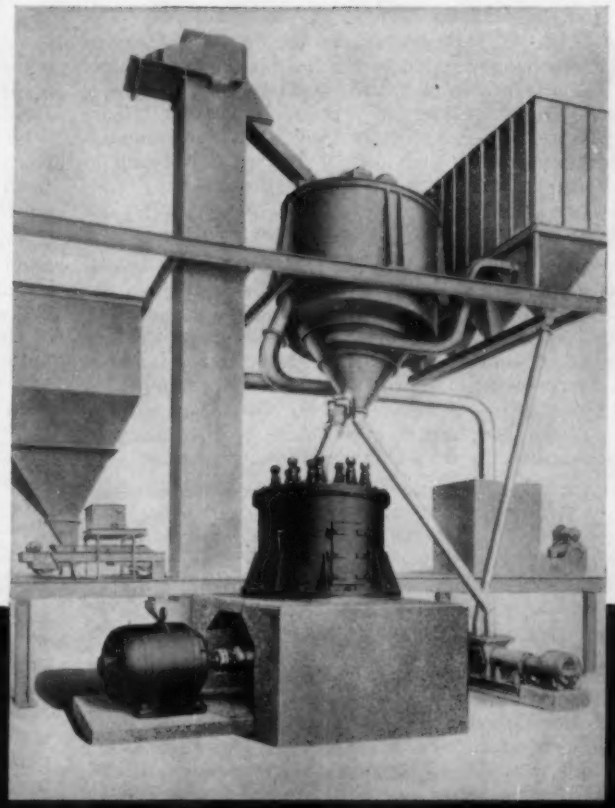
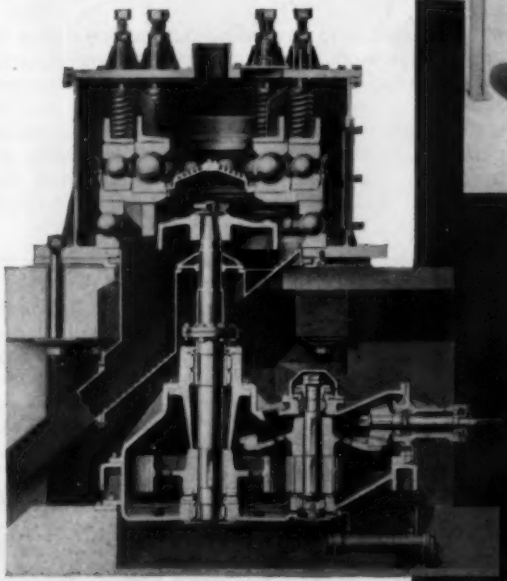
Here's How B&W's Closed-Circuit System

Reduces RAW GRINDING *Costs*

- *No separate drying equipment needed.* Automatic and simultaneous grinding and drying of raw materials is accomplished within the B&W System.
- *Lower fuel costs.* For example, if oil is used to heat drying-air, consumption may be as low as 0.3 gal per ton.
- *Lower power demand.* Ball-and-race principle of grinding used in the B&W Type B Mill operates with an extremely low friction loss, using less power while delivering maximum capacity of product.
- *Less maintenance.* Tough, alloy grinding elements of the B&W Type B Pulverizer are of specially selected steels and heat-treated for maximum wear-resistance, to assure uniform, self-equalizing wear throughout their long life.
- *Far higher capacity in equal space.* Powerful yet compact, the B&W Type B Pulverizer has a high unit output and can replace other types without additional structure.



Typical B&W Closed-Circuit Drying and Grinding System.



Cross-section of a B&W Type B Pulverizer. Heart of the B&W Closed-Circuit System, the Type B Mill is available in sizes suitable to all capacity requirements . . . employs three sets of grinding elements and a free gravity discharge.

It will pay you to get full details of all the cost-saving features of the B&W Closed-Circuit System as they relate to your raw grinding requirements. The Babcock & Wilcox Company, Boiler Div., Process Equipment Dept., 161 East 42nd Street, New York 17, N. Y.

BABCOCK & WILCOX

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editorial

Cooperate in the Sand and Gravel Industry Survey

WITH the rapid growth in size and complexity of our industrial structure it has become increasingly apparent that up-to-date information and statistics on each major industry are necessary if these industries and government are to function efficiently and economically. Business needs such data if it is to adjust itself to trends and conditions, and government needs it in order to make its plans, particularly in counteracting any serious recession or inflation before it gets too far under way.

Such current information is already being made available on many of our key industries such as wholesale and retail sales, iron and steel, farming, construction volume, contract awards, and on portland cement, phosphate, and a few other products in the nonmetallic minerals industries. Some of these records are being kept, and regular analyses of these are made by various departments of our national government and others by the industries themselves, usually through their trade associations.

Data on some of these industries are collected daily, weekly, or monthly, others quarterly, still others annually, and several not at all. Monthly, weekly, or daily figures are obtained on enough of the important basic industries, on business transactions, etc., to make possible fairly accurate analyses of the state of our economy and less accurate estimates of the future.

IN many industries, however—and particularly in the PIT AND QUARRY field, sand and gravel and crushed stone—such information is collected only annually and is not made available for as much as two years later. For example, in preparing our estimates on past and future production of these two products in the January (1954) Annual Preview and Review Number of PIT AND QUARRY, we had available actual official production data only through 1951. Only by supplementing this with our own industry survey were we able to find even a fairly firm basis to work on.

Statistics on most of the nonmetallic mineral industries are kept by the U. S. Bureau of Mines and, at one time, they were made available with reasonable promptness. In recent years, however, all statistics, with the exception of cement and a few others, have been seriously delayed. This delay, we understand, is due to the difficulty of getting adequate help and funds within the Bureau, to the expanded work it is being called on to do, and to the depletion of its experienced staff members who are being diverted to such vital new bodies as the Atomic Energy Commission and to private industry.

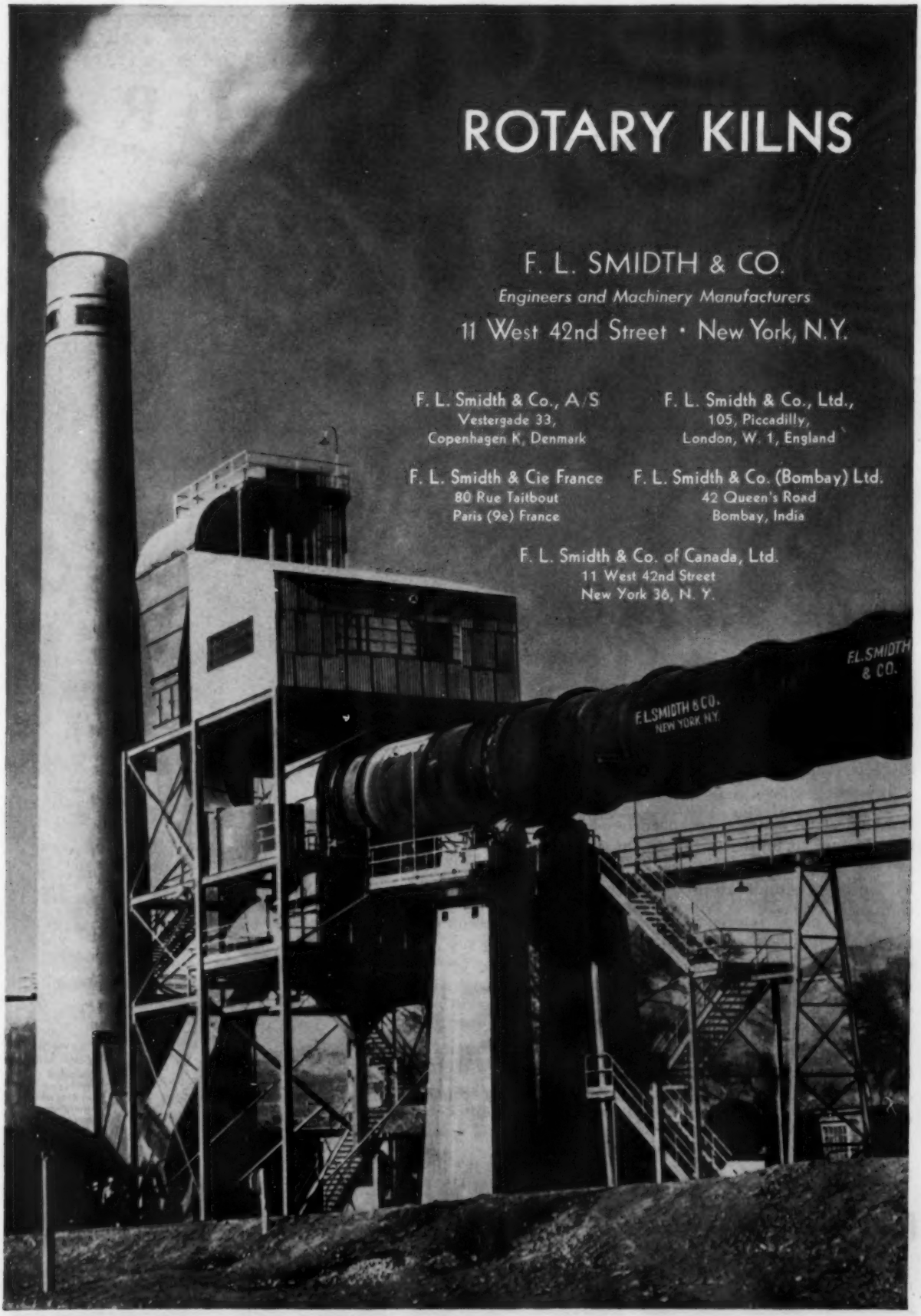
UNTIL a few years ago there were no figures of any kind available on the production of ready-mixed concrete. Cement manufacturers, the National Ready Mixed Concrete Association, and others made their own estimates, based on the percentage of their output sold to the ready-mix industry, and we made our annual survey. Finally the N.R.M.C.A. decided to go ahead with its own survey of the entire industry on an annual basis and issued its first questionnaire in 1952 for a report on 1951. Questionnaires were sent to all producers of record, whether or not they were members of the association.

The success of this venture inspired the National Sand and Gravel Association to decide recently to make a similar annual study of the sand and gravel industry, and the first one (for 1953) is now under way. The primary aim, of course, is to provide information of great value to the industry and to government. The association also believes that the general public is unaware of the vital service the sand and gravel industry performs and that this study will help to develop a wider appreciation of its importance in our economy and also promote better public relations for all producers. The availability of such up-to-date information will also help to establish the importance of this industry in times of national emergency, when essential materials are restricted. Next year and thereafter the survey will be made immediately after the end of the year.

THE association has mailed a questionnaire to all commercial sand and gravel producers of record in the United States, regardless of whether or not they are members of the association. This questionnaire has been reduced to bare essentials and asks only for that information necessary to provide useful data. All answers are kept confidential; and the data will be used without disclosing individual figures, so as to make it impossible to identify the data of a specific company.

All of the questions asked can be answered by the average company without much difficulty. Absolutely precise figures are not required; if these are not available, the best possible estimates will suffice. If any of the questions cannot be answered, they may be omitted. The important thing is that each sand and gravel producer, no matter how small or remote, fill in this report to the best of his ability and return it to the N.S.G.A. promptly. If you have not received a copy of this questionnaire, write at once to the National Sand and Gravel Assn., 1325 E St., N.W., Washington 4, D. C., and a copy will be sent to you. Remember that in co-operating in this survey you are doing a service to yourself, as well as to your country and your industry!

Walter E. Trauffer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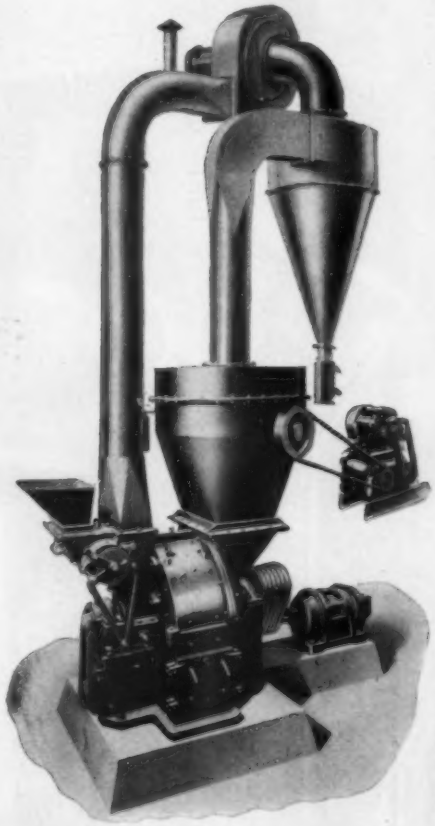

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B-50

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news of the industry

PIT AND QUARRY

N.L.A. Operating Division To Hold Next Meeting In Milwaukee, Sept. 20-22

Dates and location of the next National Lime Association Operating division meeting have been announced—September 20-22 at the Pfister Hotel, Milwaukee, Wis.

Clarence Stielstra (Dow Chemical Company), N.L.A. program chairman; Michael Brisch (Rockwell Lime Company), Operating Division chairman; and Fred Nast Jr. (Western Lime and Cement Company), chairman of arrangements, have planned an interesting program. An attractive possibility is a post-meeting tour of several lime plants on September 23.

On September 20 the plants of the Nordberg Manufacturing Company and the Allis-Chalmers Manufacturing Company at Milwaukee will be visited, including the A.-C. Basic Materials Research Laboratory, which is equipped with rotary kilns and all types of crushing and milling machinery. Other sessions will include a series of panel discussions and short papers featuring innovations in lime manufacturing.

Lone Star's Hudson Plant Reaches Work Agreement

Employees of the Lone Star Cement Corporation's Hudson, N. Y., plant recently returned to work after a seven-week work stoppage. They agreed to a one-year contract with the company through the AFL Cement, Lime and Gypsum Workers.

Plant superintendent Robert Jager announced that the agreement included immediate return to work under a contract providing for a 5-cent per hour wage increase and pay for holidays worked at 2½ times the straight-time rates.

For the six months ended June 30, 1954, the General Portland Cement Company showed net earnings of $3,117,200 after taxes, equal to $3.00 a share, as against $2,799,400 and $2.69 a share in the first half of 1953. Net sales totaled $15,800,800, com-

Coming Events

August 25-26, 1954 — Murray Bay, Quebec. Directors' meetings, National Sand and Gravel Association and National Ready Mixed Concrete Association. Manoir Richelieu.

September 20-24, 1954 — San Francisco. Annual Metal and Nonmetallic Mining Convention and Exposition, American Mining Congress. Civic Auditorium.

September 20-22, 1954—Milwaukee. Operating Division meeting, National Lime Association. Pfister Hotel.

October 5-9, 1954—Lake Placid. Industrial Minerals Division meeting, American Institute of Mining and Metallurgical Engineers.

October 18-22, 1954 — Chicago. 42nd National Safety Congress and Exposition. Conrad Hilton, Congress, Morrison, LaSalle, and Palmer House hotels.

October 20-22, 1954 — New York. Fall meeting, National Industrial Sand Association. Hotel Plaza.

Wyandotte Chemical Corp. Using Ex-Iron Ore Boats To Beat High Rail Costs

Wyandotte Chemicals Corporation will initiate a shuttle-shipping service between its Wyandotte, Mich., plant and its Chicago area consumers *via* the Great Lakes.

To implement this service the company has purchased and converted three iron ore freighters with a combined capacity of 22,500 tons, to be operated by a Wyandotte subsidiary company. The move was made in an effort to slash high transportation costs caused by steadily spiraling freight rates.

New Clinker Grinding Plant Planned by Canada Cement

Canada Cement Company, Limited, officials have announced plans for the construction of a new portland cement clinker grinding plant at Edmonton, Alta., which will be started immediately. Under a new arrangement, cement clinker will be shipped from the Exshaw, Alta., plant by rail to Edmonton and there ground into portland cement.

Included in the new installation will be a completely modern packing and distributing plant, storage silos, and related equipment.

These new facilities, it was stated, "will enable the company to provide better, faster, and more economical service to its customers in the Edmonton area."

Johns-Manville Corporation's new synthetic silicates plant to be built at Lompoc, Calif., will use lime in the process, according to a recent announcement. The silicates, to be used as inert absorbents, bulking agents, or extenders in paints, rubber, and other products, will be made directly from crude diatomite by reaction with lime and magnesium under pressure.

May, June Construction Continues High Trend—Six-Month Totals Soar

Contract awards totalling nearly $2,000,000,000 in May for future construction in the 37 eastern states set "phenomenal" new records, Thomas S. Holden, vice-chairman of F. W. Dodge Corporation, disclosed to the directors of the American Institute of Architects in their annual convention in Boston.

The May total, $1,925,253,000, was 14 percent ahead of April, and 20 percent ahead of May, 1953.

May's nonresidential total was $672,288,000, up 11 percent above April and 16 percent above May, 1953. The month's residential total was $825,300,000, up 4 percent over April and 29 percent over May, 1953. This set a new high for any month in the residential classification. Public works and utilities classification totalled $427,665,000, up 47 percent over April and 11 percent over May, 1953, setting a new high for May.

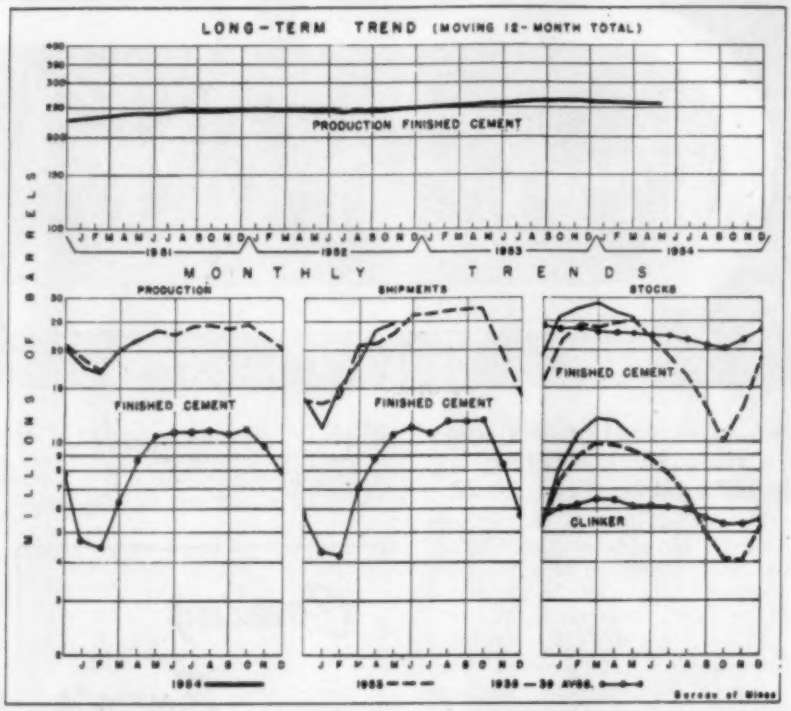
Contracts for future construction in the 37 states east of the Rockies again smashed records in June after breaking numerous other monthly records within the last year.

The June total of $1,733,264,000 was the highest for any of the 63 Junes in Dodge's history and was 43 percent ahead of June, 1953. It rounded out the highest first half of any year with a total of $9,251,149,000, up 17 percent from the first six months of 1953.

According to Dodge's vice-chairman, Thomas B. Holden, "The average monthly contract total for the first six months was $1,542,000,000. The last six months need average only a trifle above $1 billion to equal the all-time yearly high of $17,443,463,000 set in 1953. The Dodge grand total for the 37 eastern states has not fallen below $1,000,000,000 since February, 1952."

The June total construction figure was 10 percent behind May. June nonresidential awards of $656,445,000 wer 2 percent below May but 43 percent above June, 1953; residential awards were $720,266,000, down 13 percent from May but 56 percent above June 1953; heavy engineering, $356,553,000, down 17 percent from May but 24 percent above June, 1953.

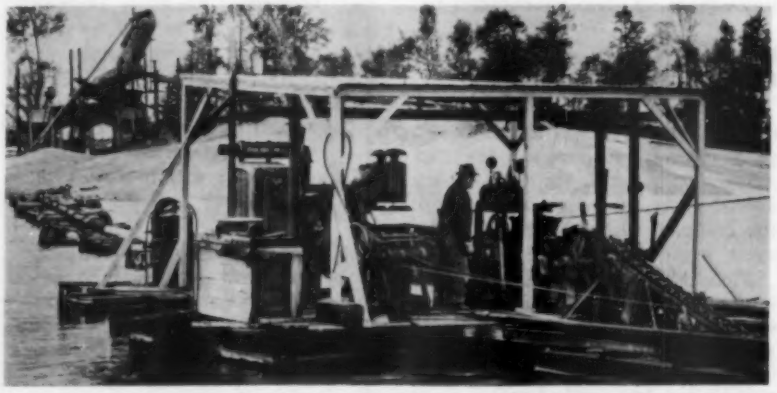
Individual six-month 1954 totals compared with the like period 1953 were as follows: nonresidential, $3,408,009,000, up 15 percent; residential, $3,980,691,000, up 22 percent; heavy engineering, $1,862,449,000, up 10 percent.



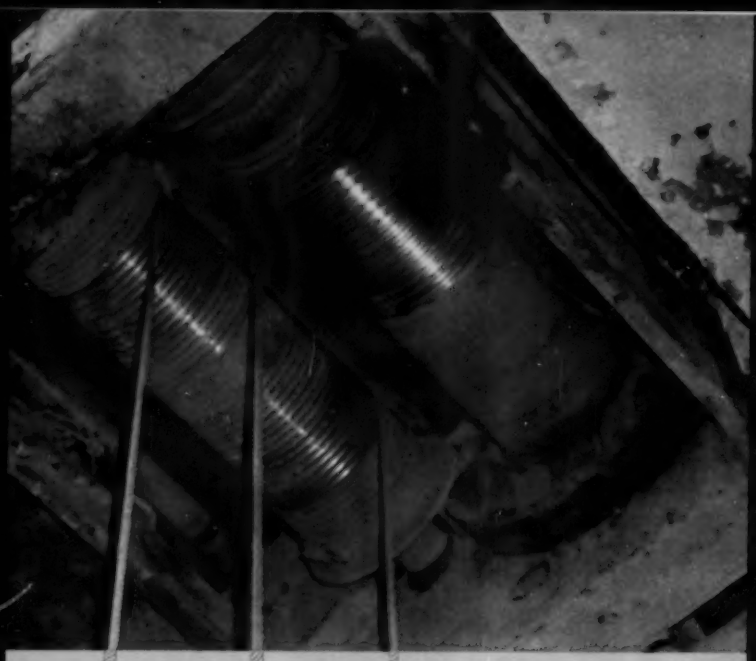
SUMMARY — Production of finished portland cement in May, 1954, as reported to the U.S. Bureau of Mines, totaled 23,256,000 barrels—1 percent less than in May, 1953. Mill shipments totaled 24,888,000 barrels—9 percent more than in the preceding May—while stocks of 25,412,000 barrels of finished portland cement on hand at the end of the month was 1 percent higher than those reported on hand May 31, 1953. Clinker production during the month totaled 21,968,000 barrels—5 percent less than clinker production in May, 1953.

PRODUCTION — One hundred and fifty-six (156) plants located in 37 states and Puerto Rico reported production of 23,256,000 barrels of finished portland cement during the month, compared to 156 plants which manufactured 23,399,000 barrels during the month of May, 1953. Clinker production during the month was 21,968,000 barrels, compared to 23,074,000 barrels in May, 1953. Cumulative reports for the first five months of 1954 show that production and shipments of portland cement are 2 percent lower and 1 percent higher respectively, than for the first five months of 1953.

SHIPMENTS — Mill shipments of finished portland cement totaled 24,888,000 barrels, 9 percent more than in the same month of the previous year. Shipments were higher in 16 districts and lower in 4 districts compared to shipments in May, 1953. Largest percentage gains were in the eastern Missouri-Minnesota-South Dakota, western Pennsylvania-West Virginia, Michigan, Ohio, and Kansas districts. The major decrease in shipments was recorded in the New York-Maine district. Cumulative figures for the first five months of the year show largest increases in shipments in the Kansas, eastern Missouri-Minnesota-South Dakota, Ohio, and Michigan districts, while the principal decreases were in the northern California, New York-Maine, and Tennessee districts.



● The dredge unit operated by the Hubscher Company of Mt. Pleasant, Mich., in hydraulic sand and gravel mining, using a G.M. diesel engine, V-belted to an 8-in. main pump, a two-piston reciprocating priming pump, a winch, and a hydraulic ladder as equipment. The 35-year old concern has moved nearly a million cu. yd. of sand and gravel in the last seven years, forming a 20-acre lake 30-ft. deep near Clare, Mich. Materials are pumped through 700 ft. of discharge pipe at a rate of 100 t.p.h., bulk and weight having been kept at the minimum in the barge. The operation is a simple one-man job.



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Calaveras Cement has achieved tremendous savings using such TSP products as Sheave Wheels, Track Wheels, Trunnion Rollers, Gears, Pinions, Sprockets, as well as Crane Drums.

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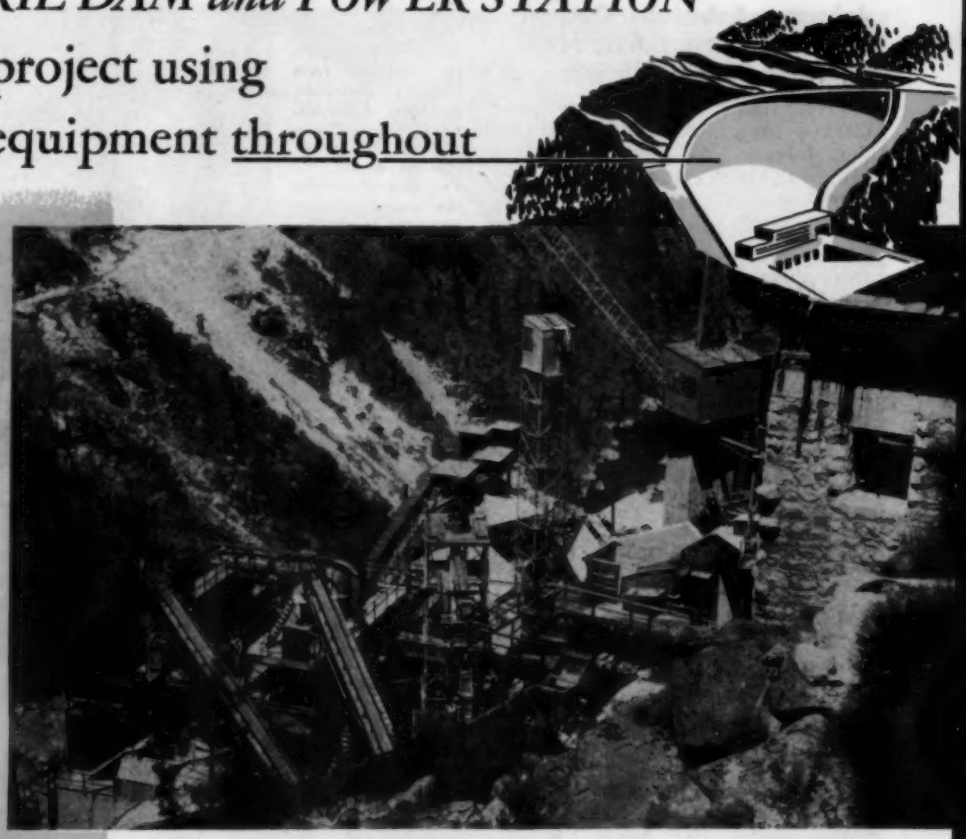
North Carolina clay is hard digging, yet an Eimco 105 with an inexperienced operator loaded 153 trucks in its first 8 hour day on the job. A conventional front end loader in the same price category with the same bucket capacity and under identical conditions using an experienced operator was only able to load 75 trucks in the same length of time. You too, can get twice the production for the same capital outlay by buying an Eimco 105.

On the Waldo grade north of San Francisco an Eimco 105 is used in the tunnel to speed up mucking. As the top is broken out to make way for the huge steel supports muck runs down into the two pilot headings where only 15-20 minutes mucking time is required for approximately 75 yards per side. Fast, small trucks carry the muck out to stockpile where the same 105 loads into large trucks during drilling cycle.

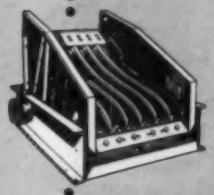
Stockpile loading into trucks in Massachusetts. Eimco 105's load rock, sand, gravel, slag, brick, clay or any other material and two speed discharge makes it possible to fill large or small trucks. Independent track operation provides unlimited maneuverability, simple controls make handling easy. Write for more details to The Eimco Corporation, Salt Lake City, Utah.

B-69

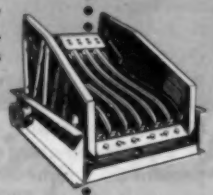
Portugal's CABRIL DAM and POWER STATION
another major project using NORDBERG equipment throughout

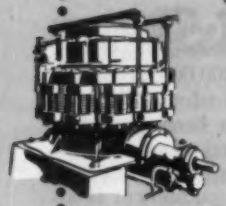


30" Nordberg-Symons Primary Gyratory Crusher

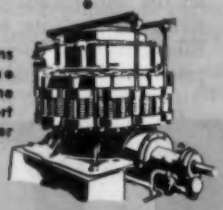


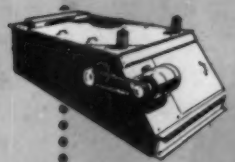
Two 42" x 5' Symons Vibrating Bar Grizzlies

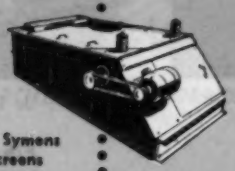




One 4¼' Symons Standard Cone Crusher and One 4' Symons Short Head Cone Crusher







Two 3' x 8' Symons Rod Deck Screens

Q253

NORDBERG Machinery and "Know-How" again selected for another important project . . . this time by *HIDRO-ELECTRICA do ZEZERE,* of Lisbon, for the construction of the new Cabril Dam and Power Station, in Portugal.

Major equipment supplied by Nordberg for this installation includes a 48″ Apron Feeder; a 30″ Symons® Primary Gyratory Crusher; a 4¼′ Symons Standard Cone Crusher; a 4′ Symons Short Head Cone Crusher; two Symons Vibrating Bar Grizzlies; and two Symons Vibrating Rod Deck Screens.

The outstanding success of this modern Nordberg equipment has been amply proved by the many statements of complete satisfaction written by the engineers and supervisory personnel connected with the Cabril Dam project.

Here, then, is further evidence that for large or small operations—including mineral reduction, base or precious metals, public works projects, or commercial aggregate production—you can depend on NORDBERG EQUIPMENT to deliver maximum output at lowest possible cost.

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Johnson Asbestos Co. Now Producing Asbestos At New $8,000,000 Mine

Production has started in the $8,000,000 Megantic asbestos mine of the Johnson Asbestos Company, Montreal, Quebec, Canada. Capacity of the new mill will be 4,000 tons per day, more than double the company's previous output. Other company operations are located at Thetford Mines (2,400 tons per day) and Black Lake (800 tons per day).

The privately owned company, one of five major asbestos producers in the Thetford Mines district of Quebec, is numbered among Canada's oldest asbestos mining companies.

At full production the new facilities will employ some 225 workers. A. S. Johnson, president, recently presided at the official opening of the new mine.

● Walter E. Trauffer (right), editor of Pit and Quarry, accepts from Ned H. Dearborn, president of the National Safety Council, the 1953 Public Interest Award. Pit and Quarry was for the second consecutive year among the specialized magazines receiving this award, which is presented annually on a non-competitive basis to public information media for exceptional service in promoting safety. The awards to recipients in the Chicago area were made on June 14.

Four Dravo Board Members Retire After Long Service

Four veteran Dravo men, all former members of the board of directors of the Dravo Corporation, Pittsburgh, retired on July 1 with a total service record of more than 188 years.

W. Agnew Bliss, who completed 49 years with Dravo, joined the organization in May, 1905. In 1927 he became sales manager and assistant to the president of Keystone Sand & Supply Company, the predecessor to Dravo's Keystone Division. He served as a director of Dravo from 1930 to 1949. He also was a vice-president and director of Charleroi Supply Company, a Dravo subsidiary.

Samuel P. Felix had served Dravo for 43 years. In 1910 he joined the Philadelphia office, of which he later became manager. He also served for several years as a vice-president and director of Dravo Corporation's Machinery Division.

Estep T. Gott had been associated with Dravo for 48 years. He came to the former Dravo Contracting Company in 1906. Elected a director in 1934, and a vice-president four years later, he continued in these capacities until 1949.

J. S. Miller had 47 years of Dravo service. He came to the company in 1906 from The Bessemer & Lake Erie Railroad, rising to a vice-presidency and directorship of the Dravo Contracting Company 18 years later, and becoming its president in 1934. When Dravo was incorporated in 1936 he was named general manager of The Contracting Division, as well as a director and senior vice-president; he also served as a member of its executive committee.

Accident Control Stressed In New Booklet on Safety

National Safety Council's new booklet, *Plus Costs,* tells concisely how accidents add to the cost of doing business and nibble at profits, and outlines the "why" and "how" of accident control. Intended specifically for those small firms with relatively few employees and no safety staff, *Plus Costs* sets down seven easy steps for eliminating accidents and suggests sources of help.

Single copies of the eight-page booklet, attractively illustrated with two-color drawings, may be obtained by writing the Small Business Program, National Safety Council, 425 N. Michigan Avenue, Chicago 11, Ill.

New Quarry, R.M.C. Plant Opened by El Paso Producer

Hayes and Elliott Company, of El Paso, Tex., announced that production began early in June in their new rock-quarrying, ready-mixed concrete, and asphalt-mixing facilities near El Paso. The firm formerly operated as a land-leveling and soil-moving contractor.

The new venture will employ 200 persons and represents an initial investment of over $800,000, according to Jim Elliott, one of the partners. Over 40 acres have been cleared at the quarry site, and a new diesel-electric rock crushing plant has been set up. Additional equipment is arriving at the site each day. Hays Elliott holds a 20-year lease on approximately 2 sections of land.

W. Agnew Bliss

Samuel P. Felix

Estep T. Gott

J. S. Miller

A *Ring* OF *Extra Service* IN EVERY ONE

Rings for turbine reduction gears . . . thrust rings for bearing raceways . . . die rings for mills . . . Midvale craftsmen make them all. From the smallest ones of a few inches in diameter to one hundred eighty-five inches, from twenty pounds to twenty thousand pounds they are quality-controlled in every step.

Each Midvale ring is exact in metallurgical specifications because of the experienced steel making practices and complete open hearth and electric furnace facilities of Midvale. Rings are carefully shaped by craftsmen with years of forging and rolling skill. Heat treated in temperature controlled furnaces to assure wearing qualities that will withstand the severest friction, abrasive, crushing and grinding action.

This is why Midvale rings are noted for their long life . . . why gear makers order Midvale blanks . . . why Midvale rings and roll shells are used on the toughest installations. The men of Midvale working with the right equipment and facilities offer you a source of rings, rolls and forgings unsurpassed in quality and extra performance.

THE MIDVALE COMPANY- Nicetown, Philadelphia 40, Pa.

Offices: New York, Chicago, Pittsburgh, Washington, Cleveland, San Francisco

MIDVALE

FORGINGS, ROLLS, RINGS, CORROSION AND HEAT RESISTING CASTINGS

Cedarapids

Built by IOWA

STATIONARY AGGREGATE PLANTS

"Tailor-Made" FOR YOUR INDIVIDUAL PROBLEM

What's *your* aggregate problem? Every Stationary Plant installation presents a different problem, both for specification and quantity, and every Cedarapids Plant is "tailor-made" by engineers who have an intimate knowledge of raw materials as well as the desired finished product. It takes this special Cedarapids engineering to squeeze out those *extra* dollar-making tons of capacity, and meet the strictest specifications. Ask your Cedarapids distributor for details.

(*Above*) **CORAL ROCK is crushed at a rate of 180 tons per hour in this Cedarapids Stationary Plant designed for the Deerfield Rock Corporation of Ft. Lauderdale, Florida. This installation consists of a 3240 primary Jaw Crusher, a Reciprocating Feeder, a 3042 Double Impeller Impact Breaker for secondary reduction and 8 conveyors of various types.**

(*Below*) **Crushing GLACIAL GRANITE GRAVEL is another type of operation for which the Stationary Plant owned by E. G. DeLia & Sons, Northville, New York, was designed. The plant contains a 2222 Double Impeller Impact Breaker, a Water Scalping Tank, a 48" x 12' Triple Deck Screen, a Double Screw Sand Washer, two 48" x 10' Horizontal Screens and 6 various size conveyors.**

(*Above*) **A combination of CEMENTED GRAVEL, GRAVEL AND LIMESTONE was the crushing problem solved in California by McCammon-Wunderlich Company's Stationary Plant which includes a primary Jaw Crusher, another Jaw Crusher and Roll Crusher for secondary reduction and two Horizontal Vibrating Screens. All plant conveyors are equipped with Cedarapids-Schrock Motorized Head Pulleys.**

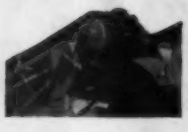
IOWA MANUFACTURING COMPANY • Cedar Rapids, Iowa, U. S. A.

JAW CRUSHERS

DOUBLE IMPELLER IMPACT BREAKERS

ROLL CRUSHERS

HORIZONTAL VIBRATING SCREENS



MOTORIZED HEAD PULLEYS

HEAVY-DUTY APRON FEEDERS

Nearly $2,000,000,000 Available for 1955-57 Federal-Aid Highways

President Eisenhower recently approved the new Federal-Aid Highway Bill providing $1,932,000,000 for the two fiscal years beginning July 1, 1955. State governments will receive approximately a 50 percent increase in Federal-Aid highway funds. Authorization in each of the fiscal years 1956-57 will total $875,000,000, compared to $575,000,000 in the 1952 Act.

The following tabulation will permit an easy comparison of annual authorizations contained in the 1952 Act and the 1954 Act.

Authorization for:	1952 Act	1954 Act
Primary system	$247,500,000	$315,000,000
Secondary system	165,000,000	210,000,000
Urban areas	137,500,000	175,000,000
Interstate system	25,000,000	175,000,000
Total Federal-aid	$575,000,000	$875,000,000
Forest highways	$ 22,500,000	$ 22,500,000
Forest roads & trails	22,500,000	24,000,000
Park service roads	10,000,000	12,500,000
Parkways	10,000,000	11,000,000
Indian roads	10,000,000	10,000,000
Public lands roads	2,500,000	1,000,000
Total each fiscal year	$ 77,500,000	$ 81,000,000

In signing the bill, to which he had given his strong personal support during its consideration by the Congress, the President said:

"This legislation is one effective forward step in meeting . . . accumulated needs. It keeps in the states, as I deeply believe it should, primary responsibility for highway construction. At the same time, it recognizes the responsible relationship of the Federal Government to the development of a sound, nation-wide highway system.

"The almost two billion dollars authorized by the new law is the largest two-year sum ever provided for Federal highway programs. Nevertheless, the needs are so great that continued efforts to modernize and improve our obsolescent highway system are mandatory."

Signing of New Contracts Reopens N.Y. Cement Plants

Several eastern cement plants were involved in labor difficulties in recent weeks. At the North American Cement Corporation's facilities near Alsen 215 striking employees ended a walkout lasting a month when they accepted a company offer of a 5-cent-an-hour wage increase. Additional provisions were made in the two-year contract for another 5-cent raise next year and holiday pay at the rate of 2½ times the base wage. North American workers at Howes Cave N. Y., also accepted the same contract.

Universal Atlas Cement employees at Hudson, N. Y., returned to work after a strike of eight weeks after a settlement had been made by the AFL Cement, Lime and Gypsum Workers Local 189 and the company. Terms of this new contract were the same as those signed by North American personnel.

Concurrently striking workers at the Dragon Cement Company's Thomaston, Maine, plant and the Lehigh Portland Cement plant at Ormrod, Pa., agreed to similar terms. The original goal of the striking employees had been a 10 percent wage increase and other benefits.

• In a brief ceremony at Stoneco, N. Y., a 550-lb. polished dolomite slab was presented by Wilson P. Foss III, president of the New York Trap Rock Corporation, to the Warm Springs (Ga.) Foundation. The outline of the state of New York is etched on the stone, which also shows the location of Albany and Hyde Park and bears the inscription: "Quarried at Stoneco, 12 miles south of the birthplace of Franklin Delano Roosevelt". At Warm Springs, it will be set in a panel of stones from every state in the Union. Present at the ceremony were H. B. Johnson, city manager, Poughkeepsie; F. J. Buffington and G. P. Boyle, vice-presidents, New York Trap Rock Corp.; Mrs. Franklin D. Roosevelt; C. F. Palmer, Warm Springs, Ga.; and Mr. Foss.

Cover Picture....

• This aerial view (see our cover) shows nearly the entire operation of the California Portland Cement Company at Colton, Calif. This plant has recently undergone an extensive expansion and improvement program. At the left is shown a part of the quarry, and in the foreground is the primary crusher building of the new crushing-and-screening department. Included in the equipment is a 1,500-t.p.h. primary gyratory crusher. Extensive dust-collecting equipment was also installed after pilot tests had been made.

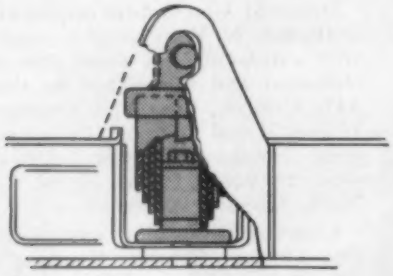
Midwest Division Opened By Natl. Gypsum Company

To handle its increasing sales, the National Gypsum Company has established a new Midwest Division with headquarters in Chicago.

Jay P. Nicely, formerly general commodity manager in Buffalo, was appointed manager of the new sales division, which includes sales districts in Milwaukee, Chicago, St. Louis, and Minneapolis.

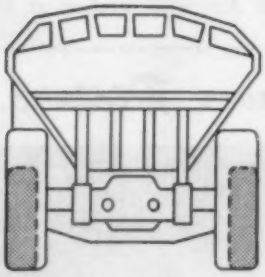
John P. Hayes, was named assistant manager of the St. Louis district, with offices in Indianapolis. The company will soon open a new Southwest Division district office in Oklahoma City.

Check all these important Dumptor®



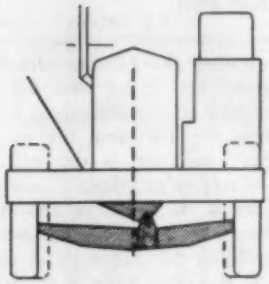
Smooth ride

Heavy, snubber-type spring is mounted between Dumptor main frame and the steering axle. Shock-absorbing action gives plenty of "cushion", takes jolts out of rough, off-road travel. Easy on operator and machine.



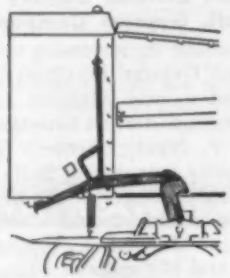
Tires track in direct line

Wider, heavier steering axle puts Dumptor steering wheels in direct line with big drive wheels. Tires track in the same path. There's less rolling resistance — better traction in soft ground and over rough haul roads.



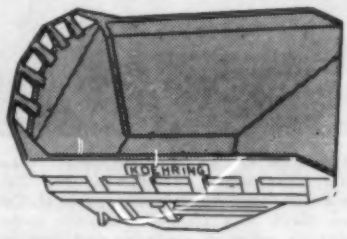
Off-set pivot on axle

Pivot point on steering axle is offset from center line 3¼" toward operator side of machine. There's no sag, even with unbalanced load. Steering axle oscillates 21°, keeps twisting strains out of main frame.



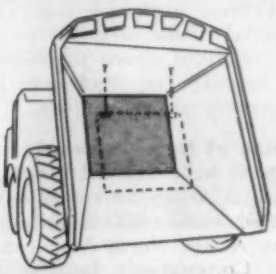
New body-latch, dump lever

Body latch for 1-second gravity dumping is simple, trouble-free. Latch is engaged by a single hook, mounted on the chassis frame. Dump lever is located inside the cab, in an easy-reach position at the operator's left.



Streamlined, all-steel body

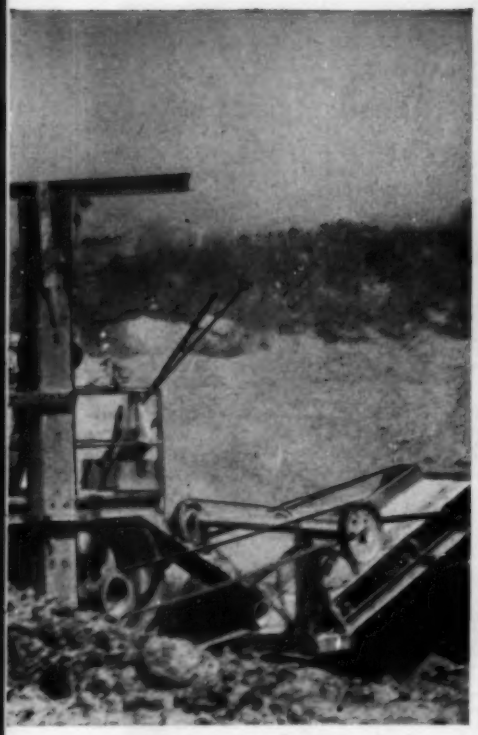
Inside is free of bulges or ledges. Top edge is box-beam constructed. Sides, ends are ribbed with 5 and 8" channels. Double-plate bottom is lined with multiple steel beams. Note ridge bar added to rock-guard teeth.



Bolted or free-swinging pan

Heavy steel kick-out pan is ½" thick. Pan can be bolted to body floor for extra protection when loading rock. Remove bolts, and pan has free swinging kick-out action, breaks suction when dumping sticky loads.

CK439



advantages

Take another look at the latest-model Koehring 6-yard Dumptor shown here. It has some important features worth checking . . .

Notice how heavy snubber-spring on steering axle cushions road shocks, yet retains Dumptor's unique advantage of no spring maintenance. There are no leaf springs. Big shock absorbing drive tires eliminate need for springs on drive axle. Alignment of drive wheels with steering wheels adds to efficiency of no-turn shuttle hauling — another basic Dumptor advantage.

Instant gravity-dumping is controlled by simple body latch and new dump lever arrangement. Notice, too, the new streamlined all-steel body. Even with all this heavy-duty strength, Dumptor still has more than 6 h.p. for every ton of loaded weight — accelerates fast, climbs 24% grades fully loaded. See your Koehring distributor for more facts.

KOEHRING COMPANY

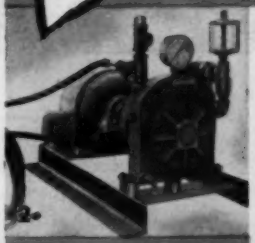
Milwaukee 16, Wisconsin

Subsidiaries:
JOHNSON • PARSONS
KWIK-MIX

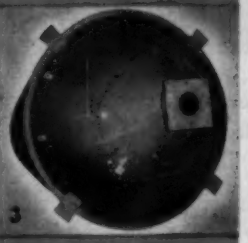
HAVE YOU OVERLOOKED ANY OF THESE IDEAS?

There are places in your batching and mix plants where these low-cost Johnson accessories can profitably increase efficiency on the storage and batching of aggregates and cement . . .

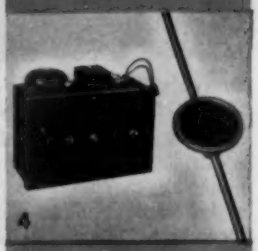
1 **Pivoted Distributor** feeds aggregates into multiple section bins. It turns and locks into position by ground-level control.



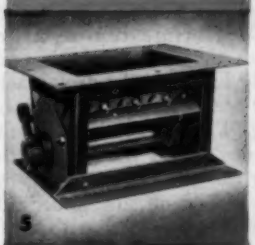
2 **Rotary Vane Compressor** supplies 7 cu. ft. of air pressure per minute to aerate cement silos and bins. Has 15-pound limit-relief valve.



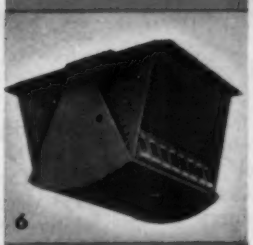
3 **Aeration Fittings** properly spaced in storage silos and tanks keep bulk cement fluid and free-flowing at all times.



4 **Bin Gauges and Signals** accurately register "hi-lo" levels of aggregates or cement. They are dust-proof . . . operation is automatic.



5 **Rotary Plug Valve** controls flow of cement from silos into screw conveyors. It's also used as a fill valve in cement batchers.



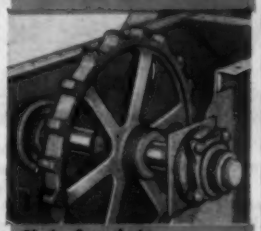
6 **Aggregate Fill Valves** single-clam, radial-type, have choker weights for jam-proof closing with large aggregates. Hydraulic pressure lub.

7 **Receiving Hoppers** all sizes, types for box-car, hopper-bottom car, truck, or bag delivery of cement. All-welded, weather-tight.

8 **Elevator Buckets, Chains** 2 types, 7 sizes of buckets for aggregates and cement. Long-life steel chain has carburized knuckles.

9 **2-Way Elevator Discharge Valve** is a flop-type chute which directs flow of cement from elevator into bin storage tank, or silo.

10 **Tunnel Gate** a single radial clam gate for stockpile reclamation. Skirt board is hinged, opens and locks in any position.



Chain Sprockets 19-tooth chilled-rim cast iron with heavy split hub and double-rim lugs. Also, 12-tooth cast-chrome manganese.

Mail to: C. S. JOHNSON CO. CHAMPAIGN, ILL. (Koehring Subsidiary)

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CITY, STATE _____

PQ 21

● Keystone Division's new distribution plant at Rochester, Pa., includes an office, a warehouse, a showroom, an unloading dock, batching equipment, storage bins, a garage, a locker room, and a boiler house. Concrete block is stored at the far right; and the large bin (far left) contains 700 bbl. of cement.

Dravo's Keystone Division Opens Distributing Facilities

Opening of a new plant for distribution of building supplies and materials to commercial, industrial, and domestic builders was announced recently by officials of the Keystone Division of Dravo Corporation. The new facilities, located near Rochester, Pa., include sand-and-gravel bins and a ready-mixed concrete plant. Transportation problems will be easily handled, since the plant is adjacent to main river, road, and rail traffic lines.

Other Dravo divisions contributed to the construction of the new plant, it was announced. Dock facilities were installed by the Contracting Division; and the Machinery Division furnished gas-fired suspended-type heating units for all buildings.

Perlite Concrete Roof Deck Scores High in Fire Test

Sponsored by the Perlite Institute and the Granco Steel Products Company of Granite City, Ill., a recent fire test was made on a steel roof deck insulated with lightweight perlite concrete. This type of construction simulated a typical industrial plant roof and proved that it could withstand a 1700 deg. F. heat for 45 minutes duration.

The construction tested covered a one-story building 25 ft. long and 10 ft. wide. 24-gauge corrugated steel sheeting was placed on 6 ft. 3 in. spans and covered with a cast-in-place insulating fill of 1-6 perlite concrete to a depth of 2 in. above the ridge of the corrugations. The concrete was reinforced with minimal mesh reinforcement to prevent shrinkage and temperature cracking. The roofing—equivalent to a 20-year bonded roof—was four-ply built-up tar and gravel. The deck had an overall insulating U factor of 0.20. The perlite concrete was placed and screeded smooth without troweling, and developed a compressive strength of about 180 p.s.i., forming a non-flaking surface for the application of the built-up roofing, which was applied in from 5 to 7 days after the concrete had been placed. The construction was claimed to be competitive in cost with less fire-resistant decks.

The fire test followed the standard A.S.T.M. time-temperature curve, with the maximum air temperature 12 in. below the deck reaching 1,700 deg. F., the deck itself 1,500 deg. F., and the top of the roof 200 deg. F. at the end of the test. After the gas jets supplying the heat were turned off, the under side of the deck was sprayed with a 40-p.s.i. hose stream and a 160-lb. man jumped up and down at the center of the deck to check its final load-carrying ability. Throughout the test the roof deck had supported a 190-lb. manikin-fireman load (see illustration).

At end of the test the total average deflection of the deck and purlins at midspan was 5⅞ in. There was no evidence of burning or visible blistering of the tar and gravel roof materials, nor had any combustible bitumen dripped through the deck. The concrete slab had separated from the corrugated metal, but was in place without excessive buckling.

Undamaged after fire exposure, a section of perlite concrete insulation from the fire-tested roof is examined by R. L. Davis, secretary-treasurer of Perlite Institute (left) and Irwin Benjamin, research director of Granco Steel Products Co. Perlite concrete slab had an average thickness of 2½ in., yet weighed only 5½ lb. per sq. ft. (The test building is in the background.)

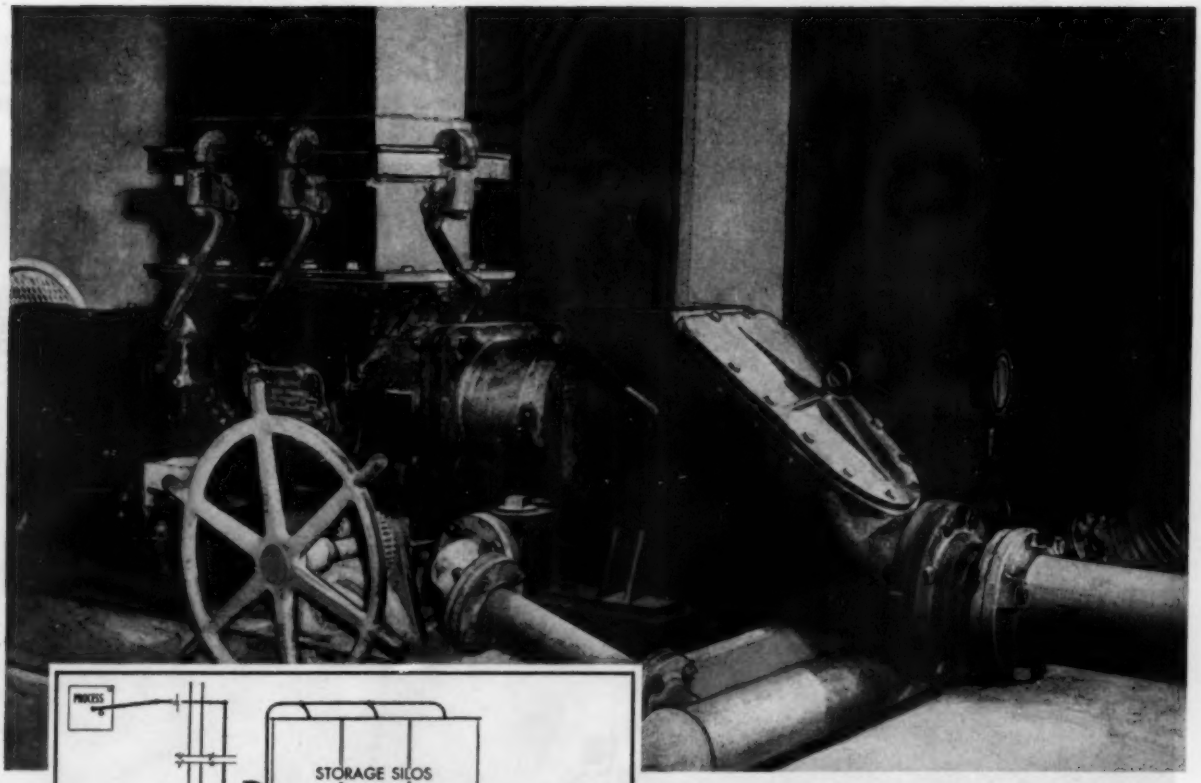
Three main reasons were given by engineers who witnessed the test for the fire resistance of the construction, compared to conventional methods of insulated roof construction: (1) no combustible or bituminous vapor seal was used between roof deck and insulation or in direct contact with the metal deck; (2) the monolithic cast-in-place perlite concrete slab eliminated multiple joints in the insulation; (3) the combination of welded-in-place steel sheets topped with mesh-reinforced lightweight concrete added high strength and rigidity to the roof construction.

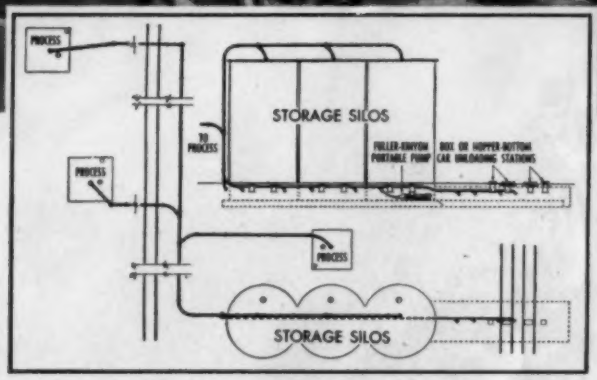
Zonolite Reports Expansion, Predicts Impressive Progress

In the annual report of the Zonolite Company for the fiscal year ending March 31, 1954, president A. T. Kearney reported capital expenditures of $623,000 for new plants and new equipment. This sum included $217,910 for the purchase of a new plant in Ellwood City, Pa., for serving the Pittsburgh district; $37,243 to lease a plant at North Billerica, Mass., and $26,319 to lease another at New Orleans, La.; and $341,438 for the installation of improved milling facilities at Libby, Mont.

The new Libby plant, now in the "breaking in" stage of initial production, will cost about $400,000. Zonolite also plans to install a new mill at Enoree, S. C., later this year at a cost of $200,000.

According to Mr. Kearney, new Zonolite products alone which were added in the past five years used more vermiculite ore than was produced in any one year prior to 1942.





Fuller-Kinyon Pump *does double duty!*

Not only does this Fuller-Kinyon Pump unload pulverized phosphate rock from either box or hopper-bottom cars, but it serves a double duty . . . it can be readily moved, on a narrow-gage track, to positions underneath any one of three silos for conveying to three widely separated process points in the plant. Connection to the silo to be emptied is easily and quickly made with quick-detachable clamps. By use of a diverting valve in the conveying line, it is possible to convey directly from car to process points if desired, by-passing the storage silos.

Years of experience and advanced engineering design by Fuller enabled the purchaser to not only reduce their initial investment by the use of one Pump for this dual purpose, but it also gives them a clean, safe, and efficient conveying system, one that will operate, day in and day out, at the lowest possible cost per ton of material handled.

Conveying capacity is rated at 50 tons an hour, with the longest single conveying distance approximately 690 feet; together with branch lines makes a total of about 1070 feet. Air for conveying is furnished by a Fuller Rotary Single-stage Compressor, piped direct to the Pump . . . air where and when needed, at the proper pressure to do the work most economically and efficiently.

If you handle dry, pulverized materials in bulk it will be worth your while to learn about Fuller air-conveying systems. Write us today.

Fuller
CONVEYS BY AIR
CLEAN . . . SAFE . . . EFFICIENT

FULLER COMPANY, Catasauqua, Penna.

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DRY MATERIAL CONVEYING SYSTEMS AND COOLERS . . . . PREHEATERS . . . . COMPRESSORS AND VACUUM PUMPS . . . . FEEDERS

"Our *Tiger Brand*

NOTICE THE CABLE TRAY fastened to the shovel. This was developed by Universal Atlas for easier cable handling.

TWO WORKMAN WATCH from blast shelter as charge is set off in distance. Low horses cushion cable from shock of falling rock.

HERE A CABLE is raised on horses to clear the railroad track. It feeds the shovel visible in background.

Amerclad lasted 12 years"

Says Chief Electrician, Hudson Plant
Universal Atlas Cement Company

Year after year, at this quarry, the Amerclad is exposed to knife-sharp fragments of flying rock. During the summer, the rock often gets so hot that you can't even touch it. Other times, the cable lies out in the rain and snow—often at sub-zero temperatures.

At the Hudson, N. Y. quarry of Universal Atlas, Chief Electrician Frank Rodmond said, "This Amerclad runs the constant danger of being hit with flying rock fragments through secondary blasting. Yet the down-time cost of this operation is so high that we just can't stand cables that keep failing. We kept that last batch of Amerclad 12 years before we replaced it, yet it was still serviceable when we switched over to new Amerclad."

If you want service like this, specify Amerclad the next time you need cable that can really take it. Amerclad is available in a great many sizes and constructions, with or without shielding. There is a type to power anything from a river dredge or mine locomotive down to a rough and tumble electric hand drill. *Send the coupon,* and get more information.

AMERICAN STEEL & WIRE DIVISION
UNITED STATES STEEL CORPORATION
GENERAL OFFICES: CLEVELAND, OHIO
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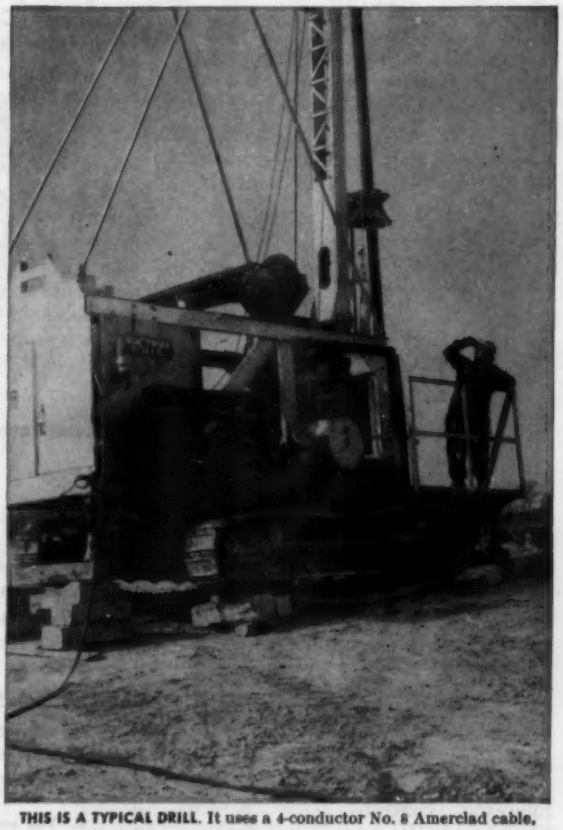

THIS IS A TYPICAL DRILL. It uses a 4-conductor No. 8 Amerclad cable.

A STANDARD TIGER BRAND CABLE FOR EVERY SPECIAL JOB!

paper & varnished cambric cable
asbestos wire and cable
aerial, underground & submarine cable
mold cured portable cord
machine tool & building wire
special purpose wire & cable
shovel & dredge cable

—SEND THE COUPON—

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Cleveland 13, Ohio

☐ Please give me more information about Amerclad.
☐ I'd like to talk to your representative.

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Firm .....
Address .....
City ..... State.....

U·S·S Tiger Brand ELECTRICAL WIRE & CABLE

USS

UNITED STATES STEEL

Death of Ralph S. Hunt, Equipment Field Veteran, Follows 5-Week Illness

Ralph Scott Hunt, a representative for the Deister Machine Company, the McLanahan and Stone Corporation, the Northern Blower Company, and F. R. Hannon and Sons, died on June 23 in Buffalo, N. Y., after an illness of five weeks.

In his earlier career as an engineer, Mr. Hunt was associated with the

Ralph S. Hunt

following concerns: the Screen Equipment Company, the Buffalo Crushed Stone Company, and the Stedman Foundry and Machine Company. He had been engaged in the sand-and-gravel equipment business since 1929.

Among his friends in the processing industry he was known as a man who was "trying to help them solve their problems, rather than merely to sell a piece of equipment"—a rare trait in a salesman.

Permanente Cement Votes 100% Stock Distribution

Directors of Permanente Cement Company recently recommended a 100 percent stock distribution and increased the quarterly dividend from 35 cents to 40 cents per share on the 1,400,000 shares outstanding.

A special meeting of stockholders was called for July 8, to consider increasing the shares authorized from 2,000,000 to 4,000,000.

Henry J. Kaiser, elected chairman of the board as well as president of the company, stated that net earnings amounted to $905,551, or 65 cents per share for the quarter ended April 30. It compared with $980,760 or 70 cents per share for the corresponding 1953 period. Mr. Kaiser indicated that this year's results would be even better than 1953's record business.

Industry's "Commandments" Prove Interest in Safety

An overwhelming demand for copies of "Ten Commandments of Safety for Supervisors" followed the recent publication of a safety decalogue for industry in the *Management Review* of the American Management Association.

As a safety aid in cutting down accidents in any industry, these "Ten Commandments" rate high praise, in our opinion. The piece was designed to teach supervisors and foremen how to lead their men into working *safely* and thinking *safety*. It makes an appeal to personnel in every company where safety is a daily work problem, particularly in manufacturing plants and in maintenance and service operations.

In addition to the men it directly addresses, it is of interest to company officers, insurance executives, safety specialists, and personnel directors of almost any concern one could name. We offer it in furtherance of the spirit which evidently prompted its original conception. Two-color copies of the "Ten Commandments" (9-in. by 12-in.), suitable for framing, may be obtained from the American Management Association, Department 97, 330 West 42nd Street, New York 36, N.Y., at 25c per single copy to 9½c per 1,000.

Ten Commandments of Safety

FOR SUPERVISORS

Your job in management places you in a unique position of trust. For not only does the company rely on you, as the direct representative of management, to apply its policies wisely and fairly; also entrusted to you is the obligation to safeguard the well-being of the workers in your charge. No responsibility transcends this in importance. In this respect your job is akin to the "stewardship" of biblical days: As a supervisor, you are indeed your brother's keeper.

On-the-job accidents represent a serious threat to the physical well-being of your men. Their prevention calls for your constant vigilance. Therefore, if you would guide your men safely through their daily work, be yourself guided by these precepts:

1. You are a supervisor and thus, in a sense, have two families. *Care* for your people at work as you would care for your people at home. Be sure each of your men understands and accepts his personal responsibility for safety.
2. *Know* the rules of safety that apply to the work you supervise. Never let it be said that one of your men was injured because you were not aware of the precautions required on his job.
3. *Anticipate* the risks that may arise from changes in equipment or methods. Make use of the expert safety advice that is available to help you guard against such new hazards.
4. Encourage your men to *discuss* with you the hazards of their work. No job should proceed where a question of safety remains unanswered. When you are receptive to the ideas of your workers, you tap a source of first-hand knowledge that will help you prevent needless loss and suffering.
5. *Instruct* your men to work safely, as you would guide and counsel your family at home—with persistence and patience.
6. *Follow up* your instructions consistently. See to it that workers make use of the safeguards provided them. If necessary, enforce safety rules by disciplinary action. Do not fail the company, which has sanctioned these rules—or your workers, who need them.
7. *Set a good example.* Demonstrate safety in your own work habits and personal conduct. Do not appear as a hypocrite in the eyes of your men.
8. *Investigate and analyze* every accident—however slight—that befalls any of your men. Where minor injuries go unheeded, crippling accidents may later strike.
9. *Cooperate* fully with those in the organization who are actively concerned with employee safety. Their dedicated purpose is to keep your men fully able and on the job and to cut down the heavy personal toll of accidents.
10. *Remember:* Not only does accident prevention reduce human suffering and loss; from the practical viewpoint, it is no more than good business. Safety, therefore, is one of your prime obligations—to your company, your fellow managers, and your fellow man.

By leading your men into "thinking safety" as well as working safely day by day, you will win their loyal support and cooperation. More than that, you will gain in personal stature. Good men do good work for a good leader.

—CHARLES P. BOYLE

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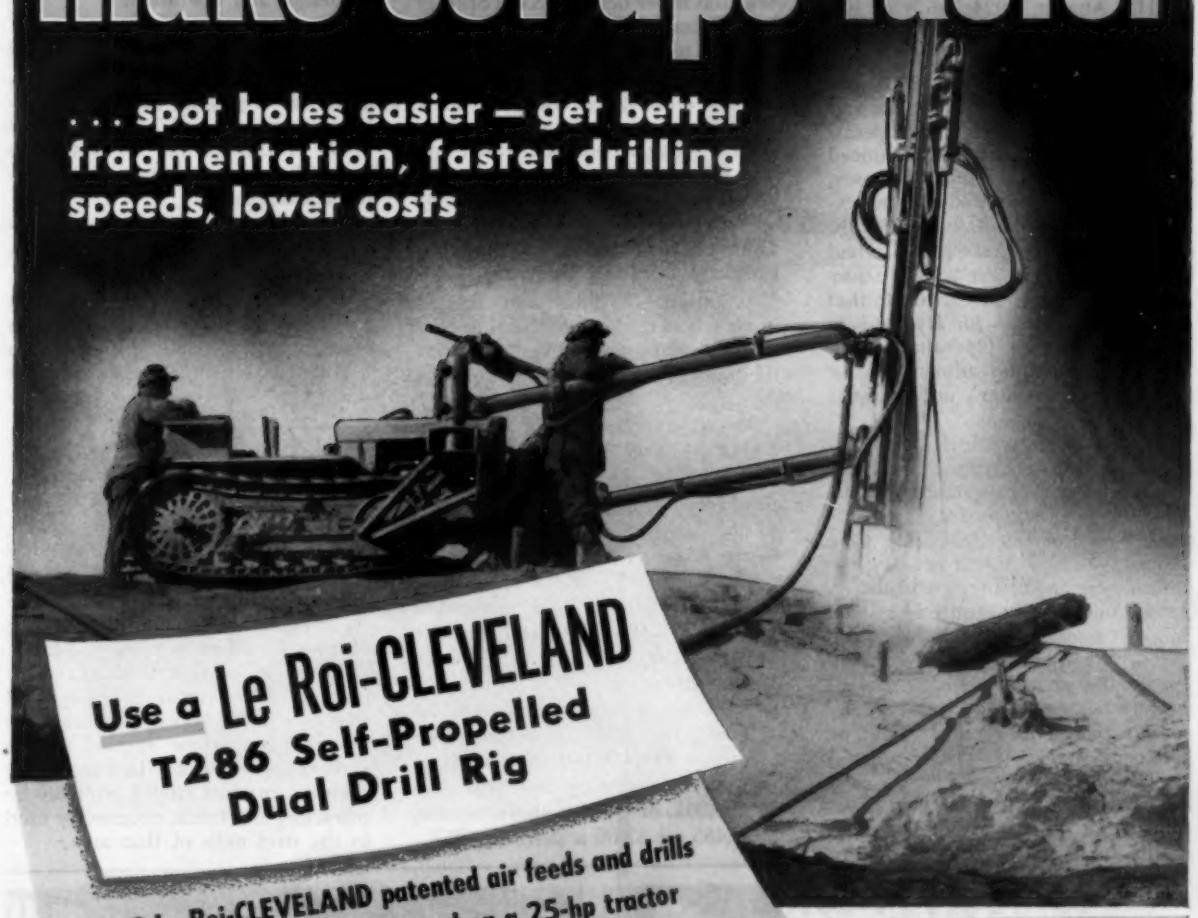
make set-ups faster

. . . spot holes easier — get better fragmentation, faster drilling speeds, lower costs



Use a Le Roi-CLEVELAND T286 Self-Propelled Dual Drill Rig

It's 2 Le Roi-CLEVELAND patented air feeds and drills with air-motor booms mounted on a 25-hp tractor

3 speeds forward . . . 1 speed reverse

ONE man *drives* the Le Roi-CLEVELAND T286 places you couldn't get to before with a wagon drill. And he tows the compressor right along. The T286 drills and cleans holes as deep as 30′ — in any direction — at any angle — with less air. All this means faster set-ups, better hole spacing, greater footage, better fragmentation, lower costs. Have your Le Roi distributor show you. Write for Bulletin RD-21.

One Le Roi Airmaster 600 cfm Compressor provides all the low-cost air you need to operate the T286 Dual Drill Rig, when it is equipped with Le Roi-CLEVELAND 4″-bore drifters. A smaller compressor is sufficient, when the T286 is equipped with the 45-lb. H10 or 80-lb. H23 (3⅛″-bore) sinker drills or 3½″-bore D25 drifter.

LE ROI COMPANY

CLEVELAND ROCK DRILL DIVISION
12500 Berea Road, Cleveland 11, Ohio
Plants: Milwaukee, Cleveland and Greenwich, O.

C-144

30 years ago in Pit and Quarry

By WALTER E. TRAUFFER

THE August, 1924, issue of PIT AND QUARRY might well have been called a special sand and gravel number as it contained detailed descriptions of five such operations and several special technical and operating articles. It was also announced in this issue that George B. Massey, an expert on the handling and excavating of nonmetallic minerals, especially sand and gravel, had joined the staff of PIT AND QUARRY as associate editor. His article in that issue, *Prime Movers for Hydraulicking and Dredging Operations,* contained much helpful information for operators of water and dredge pumps.

The first plant article described the third large new plant to be built near Oxford, Mich., in the last few years and the third to be described in these pages—that of the P. Koenig Coal Company. This 50-car-per-day operation was one of the first to use an automatic electric control system. Like the two neighboring plants, this one used a hydraulic dredge with a jet agitator on the suction. Another modern feature was the use of ground storage piles and tunnel reclaiming belt conveyors.

Another article described the just-completed $250,000 modernization program at the Louisville, Ky., plant of the Ohio River Sand Company. This operation consisted chiefly of a unique multiple belt conveyor storage and rehandling system. Material could be loaded out with this system at the rate of 300 cu. yd. per hour and the yard storage capacity was 60,000 cu. yd.

A feature of the new plant of the Kickapoo Sand & Gravel Co. at Peru, Ind., was its modern, fireproof construction. This was also a dredging operation with a capacity of 180 t.p.h., and was hydraulically operated throughout.

The recently-built plant of the Rock Island Sand & Gravel Co. near Rock Island, Ill., used a shovel and a locomotive and cars to remove overburden from the deposit. A hydraulic dredge pumped the sand and gravel to the plant. Shipments were made by rail and also by barge to the company's yard in the heart of Rock Island and to other points on the Mississippi River.

The Arkansas River Sand Company operated 12 sand dredges on the Arkansas River between Sand Springs and Tulsa, Okla. These supplied material to shore plants, which consisted essentially of dewatering hoppers for loading into cars.

The lone crushed stone plant in this issue was a good one which had been in operation just a few weeks, that of the Radford Limestone Corporation near Little River, Va. Even here pumps were featured, as overburden was removed from the deposit by hydraulicking. A regular 1-in. monitor with 200-lb. pressure did the heavy work, and a fire hose was used for final cleanup. The plant followed modern practice in its design and operation.

Special articles in this issue included one on *Excavating in Sand Pits* by D. J. Hauer, one on the importance of water in industry by Dwight Ingram, and *The Oil Engine in the Gravel Pit and Stone Quarry* by L. V. Armstrong of the Ingersoll-Rand Company.

Lime Makers' Sales, Earnings Indicate Decided Upswing

Producers of lime and related items released figures indicating considerable improvement last year over the totals for the preceding 12-month period.

Net income for 1953 of the Kelley Island Lime & Transport Company of Cleveland, was double that of the previous year. The net earnings of $1,362,721 last year included those of the Lakeside & Marblehead Railroad Company, Kelley's wholly owned subsidiary, and compared with $678,325 for both firms the previous year, according to Ralph L. Dickey, president.

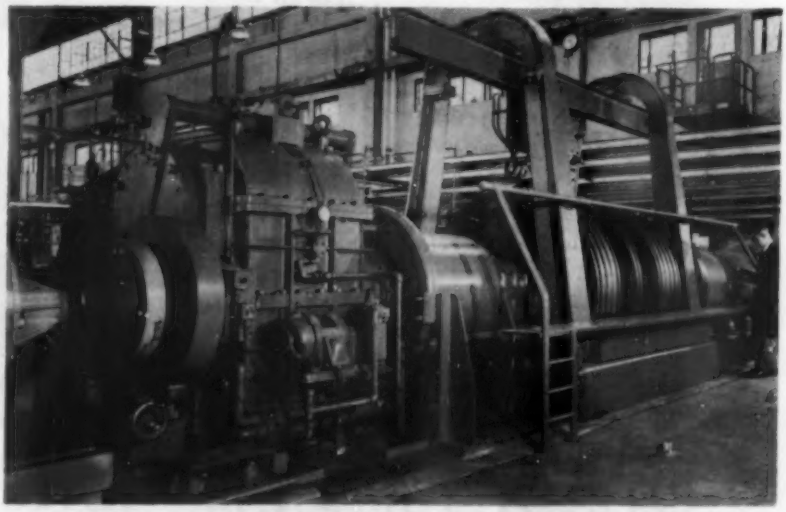
Sales rose to a new peak of $13,-139,981; the 1952 figure for both firms was $11,975,106. Net profit of the parent company last year was $1,299,201, or $4.21 a share, against $636,485, or $2.06 a share in 1952.

The annual report of Gypsum Lime & Alabastine, Canada, Ltd., also showed a good year. Net profit for 1953 up to November 30 was given as $1,613,910, compared with $1,132,878 for 1952. Earnings per share for 1953 were $3.67, and for 1952, $2.57.

Quartz Beds May Be Worked By General Refractories

General Refractories Company, Philadelphia, Pa., reportedly has paid for an option on 17 acres of land near Hindostan Falls, Martins County, Ind., for mining an outcropping of quartz, said to be of high quality.

It was stated that local quarry or mining facilities will be built, and that quartz will be shipped to a processing plant to be erected in the Calumet district of Indiana. The eventual product would probably be refractory fire brick, extensively used in the steel mills of that area.



• The largest dynamometer of its kind ever built has been put into use at the new Johns-Manville Research Center, Mansville, N. J., to test the friction materials used in the clutch and brake assemblies of all sorts of pit and quarry machinery. The giant 200-ton machine is one of several unique instruments in the new laboratory, largest in the world devoted to the study and development of asbestos friction materials.

Boost Payload, Get Rugged Power With New WHITE TANDEMS

WHITE TANDEMS are really on the move... wherever building materials need to be moved!

Their rugged power and ability to take it speeds hauling, grading and excavating. They last longer on the tough jobs, the big loads!

But the big extra which is exclusively White is the payload earning power... the extra profit because of White Specialized Design.

Tailored to exact working conditions, White Tandems get *more* work done... in *less* time... at *lower* cost.

You are losing money by the truckload if you delay getting facts from your White Representative.

Doubles Payload by Switching to WHITE Tandem Dump Units

... DE VINCENTIS CONSTRUCTION CO.
Philadelphia, Pa.

This White Model WC-2264 Tandem has nine cu. yd. dump body. It's light enough to carry 13-tons of building materials within legal limits... rugged enough for the tough "off-highway work"... powerful enough to improve your schedule time.

White

THE WHITE MOTOR COMPANY
Cleveland 1, Ohio

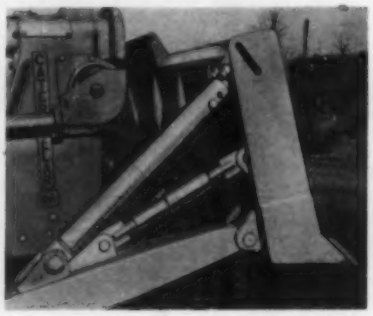
For More Than 50 Years The Greatest Name In Trucks

New Machinery and Equipment

(For more information, use card on p. 99)

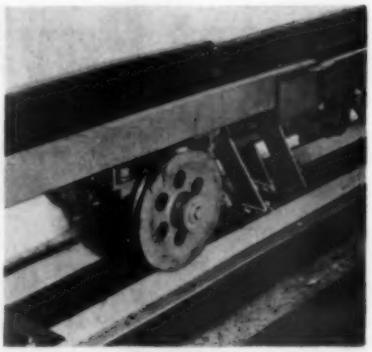
● Pretty girls are wonderful at any time. And that snow looks real great here in the middle of Summer! The gal's showing how easy it is to start a Caterpillar D4 tractor with Cat's all-weather direct electric starting system. Designed for simplicity and dependability under the most rigorous working conditions, the heavy-duty 24-volt system has automatic push-button starting and features newly-developed glow plugs for below freezing starts. (51)

● Keep the help on the job during the World Series! This rugged radio is built for mounting on tractors and other mobile equipment. It has tremendous pick-up power, handy in deep quarries, is weatherproof, and comes with a shockproof mounting, Automatic Radio Mfg. Co. says. (53)

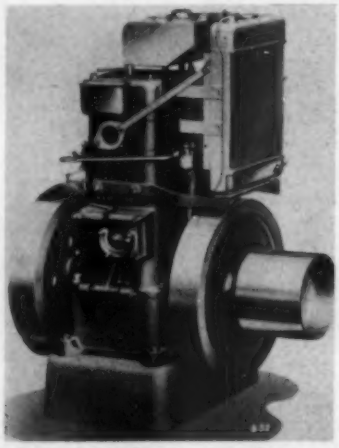


● Looseness in adjustable-type bulldozers is eliminated by this stabilizer developed by the Schneckloth Excavating Co., Clinton, Iowa. It holds the blade rigid in tilted or level positions, has all-steel construction and can be installed in less than two hours. (54)

● Several improvements over existing equipment have been built into the new Loomis cable-type drilling machine, the century-old Loomis Machine Co. reports. The redesigned K-2 machine (above) is rated to handle 1,000 lb. of tools at 500 ft. It comes with a one-piece 32 ft. mast or with a 36 ft. telescoping mast, both power-raised. A mechanical kicker that pushes the mast past center to start the lowering process is an exclusive feature. A larger model, the K-4, has a rating of 1,800 lb. at a depth of 1,100 ft. (52)

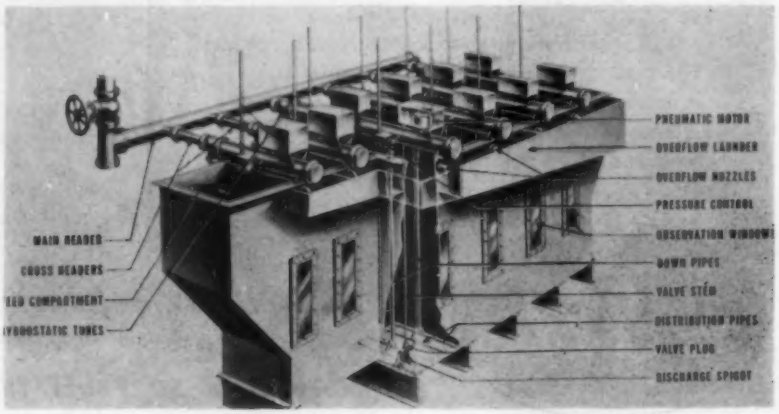


● This new, smaller vibrating conveyor from Hewitt-Robins conveys a variety of materials at 38 fpm. The 4 in. deep pans come in open or covered widths of 8, 12, or 18 in., 20 to 100 ft. long. Transfer sections couple two or more units in tandem. Leaf-spring mounted, the conveyor is vibrated by a heavy-duty one hp drive. (55)

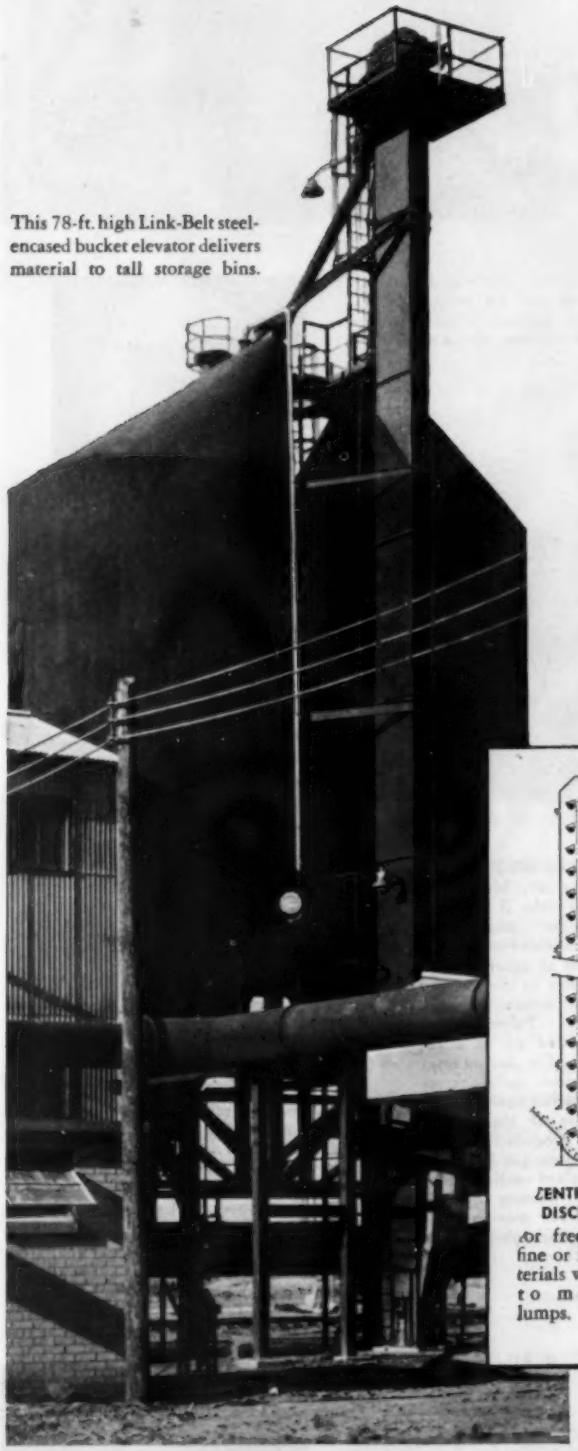


● Nationwide distribution has been established for the Bamfords single and twin-cylinder slow-speed diesels, available in the U.S. for the first time. Featuring a hinged crankcase and a detachable governor for easy adjustment, seven models range from 3½ to 16 bhp at 600-700 rpm. Direct injection type, they couple easily and need no speed reduction unit for most driven equipment. (56)

● This new hindered-settling hydraulic classifier, the Jet Sizer, has been developed by Dorr Co. for sizing and grading solids eight mesh and finer. It produces, on a continuous and automatic basis, any desired number of sharply sized fractions from feed having a wide particle size distribution. (57)



Keep your cost of lifting down



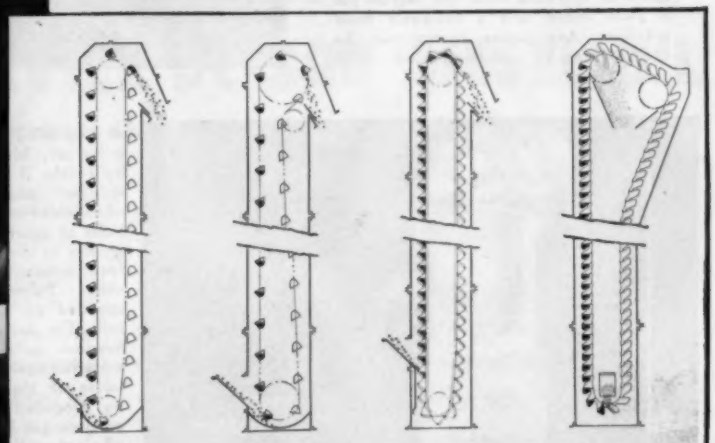
This 78-ft. high Link-Belt steel-encased bucket elevator delivers material to tall storage bins.

Let LINK-BELT recommend the bucket elevator that best meets your requirements from 13 types in 4 basic designs

WHEN a materials handling problem occurs concerning the elevation of loose materials, the first solution is usually a bucket elevator. And, because Link-Belt builds a type and size for a complete range of materials and capacities—you're sure to get the one that's right for your job.

Equally important, when you choose a Link-Belt bucket elevator, you get the lowest possible installation, operating and maintenance costs. Rigid jig-built casings are self-supporting, require only occasional lateral tie-ins depending on height. Periodic inspection is speeded with easy access to both head and boot. Chain or belt tension is maintained at all times with screw or gravity take-ups.

For expert engineering cooperation, call your nearby Link-Belt office. You'll get an unbiased recommendation . . . with no obligation, of course.



CENTRIFUGAL DISCHARGE
for free-flowing, fine or loose materials with small to medium lumps.

POSITIVE DISCHARGE
for light, fluffy, fragile or materials that tend to stick to the buckets.

CONTINUOUS DISCHARGE
for range of materials—light to heavy, small to large, abrasive lumps.

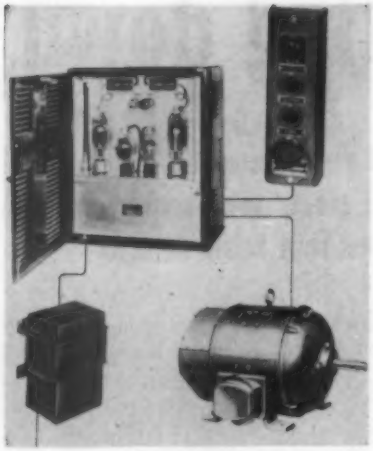
INTERNAL DISCHARGE
for gentle handling of pellets, washers, bolts, stampings, cartridge casings, seeds, etc.

LINK-BELT COMPANY: Executive Offices, 307 N. Michigan Ave., Chicago 1. To Serve Industry There Are Link-Belt Plants and Sales Offices in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Sydney; South Africa, Springs. Representatives Throughout the World.

LINK-BELT

BUCKET ELEVATORS

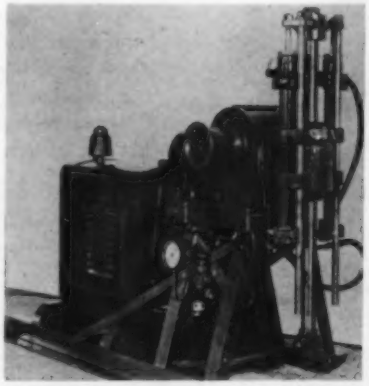
13.548



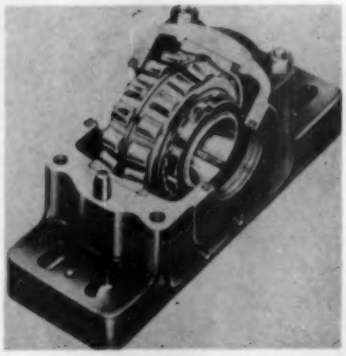
● Precise speed control is provided electronically by this new Louis Allis stepless, adjustable-speed drive for conveyors and other equipment. It comprises an anode transformer, control panel, pushbutton station, and a special d-c drive motor. Speed ranges of 5:1, 20:1, 50:1 and 100:1 are available. Optional features include inching, jogging, controlled acceleration and deceleration, dynamic braking, reversing, etc. **(58)**

● Six different dust precipitation principles are built into this new liquid-type scrubber devised by Johnson-March for low-cost installation in cinder block, concrete or steel housings. Dust is removed as a sludge, the scrubber using about 2½ gal. water per 1,000 cfm. Eight models range in capacity from 8,000 to 60,000 cfm. **(60)**

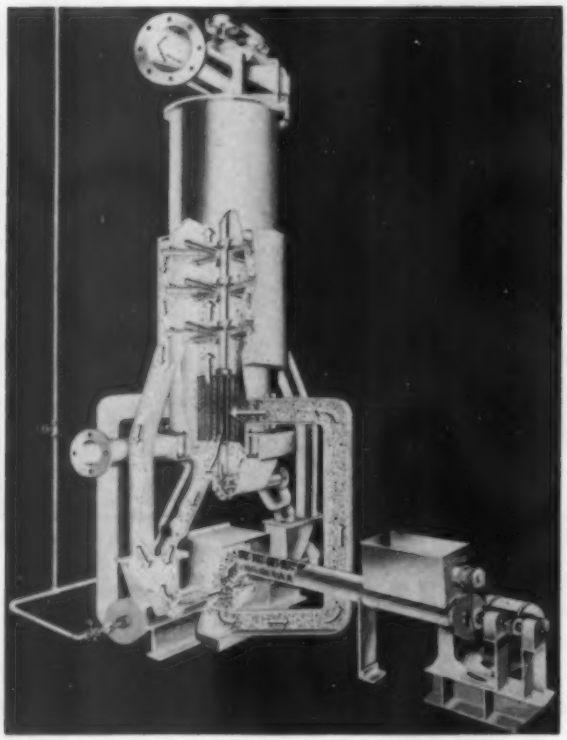
● This easy-to-wear dust hood weighs only 5 oz. and can be worn with a respirator. The picture window gives vision in all directions. General Scientific Equipment Co. **(61)**



● Compactly built and designed for rugged service, this highly portable Acker Teredo core drill gives fast service to 600 ft. Consisting of power unit, 3-speed transmission with cathead hoist, and swivel-type drill head with either screw or hydraulic feed, the Teredo has a 24-in. travel and a full-circle head rotation. Any power source can be used. It can be vehicle-mounted **(59)**

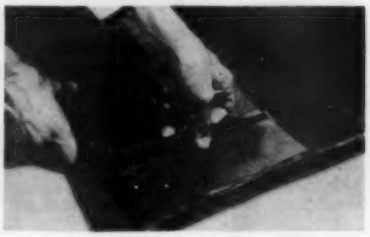


● Specially designed to withstand heavy loads and severe impacts in mines and mills, this heavy-duty roller bearing just added to the Link-Belt line incorporates precision self-aligning bearings in a particularly rugged steel pillow block housing. These "mill bearings" are made in shaft size diameters from 2-7/16 to 6-15/16 inches. **(64)**



● Improving the Jet pulverizer, Majac has built into it a "rock stripper" phase that eliminates foreign particles of great specific gravity as soon as the feed enters the machine. Pulverizing is speeded up as a result. The Jet creates head-on collisions of materials against themselves at high velocity, propelled by high pressure gas jets. Fast efficient action, precise fineness control, and few moving parts are highlights of the machine. **(62)**

● Ribbons of high tensile steel wire, inserted at intervals, feature a new anti-rip rubber conveyor belt by B. F. Goodrich. Positioned beneath the first fabric or cord ply, the wire is placed across the width of the belt to prevent lengthy rips. **(63)**



275 HP Cummins NHPS-600 Diesel Engine

6 YEARS OLD...ORIGINAL RINGS, BEARINGS USING CITIES SERVICE DC-300 DIESEL OIL

Portable Lime Pulverizer of C. B. Seamans Chalks Up Phenomenal Performance Record

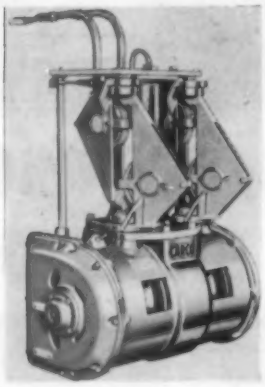
Credit C. B. Seamans of Reedsburg, Wisconsin, with a remarkable invention—a portable lime pulverizing plant which completes the cycle from crusher to storage bin under control of one operator! And credit Cities Service DC-300 Diesel Oil for the remarkable maintenance record of this unique machine. From the beginning, only DC-300 oil was used to lubricate the pulverizer's powerful 275 HP Cummins NHPS-600 Diesel engine. After three years' operation, wear on the connecting rod bearings checked out at .0005". No bearings or rings were replaced, and the engine has now completed its sixth year of service.

Cities Service lubricants can help assure outstanding performance for your stationary or mobile diesels, too. For details, contact your nearest Cities Service representative or write Cities Service Oil Company, Sixty Wall Tower, New York 5, N.Y.

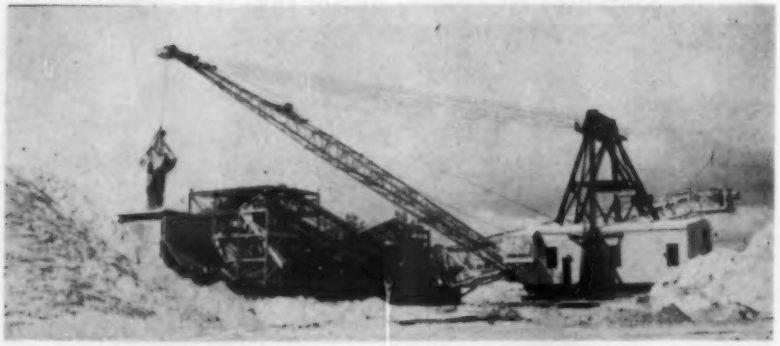
FROM CRUSHER TO STORAGE BIN—A ONE MAN OPERATION. C. B. Seamans' unique lime pulverizer is a portable, diesel-powered machine that requires only one operator to regulate process which completes entire cycle from crusher to storage bin. Lubricated by Cities Service DC-300 Diesel Oil, the machine has been operating for six years on original rings and bearings!

CITIES SERVICE
QUALITY PETROLEUM PRODUCTS

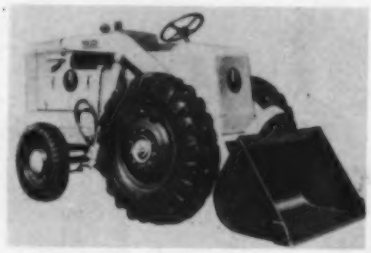
● Rated on the basis of a 10-ft., 4-yd. dump body, this new Galion Allsteel dump body hoist has an 8½-ton capacity. It has an all-steel subframe, weighs 1025 lb., needs 14 in. mounting height, and dumps at a 50 deg. angle. The heavy-duty pump mounts vertically or horizontally. (65)



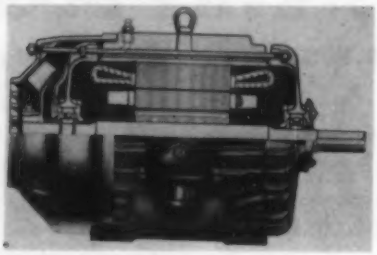
● This new double-drum Carco tractor power control unit from Pacific Car and Foundry Co. has double swivel fairleads, one-lever control, constant mesh gear train, multiple disc clutch, differential type brake. (66)

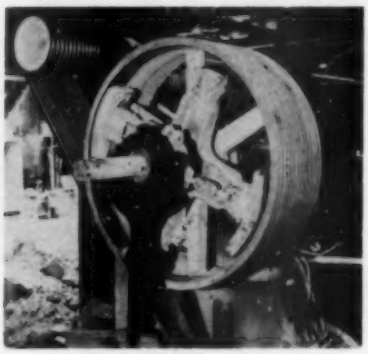


● This Marion clamshell, believed to be the world's largest on a long boom went into service recently at the Bunnell plant of the Lehigh Portland Cement Co. in Florida. A 9½-yd. clamshell on the 175-ft. boom of the Marion 7400 walking dragline handles a mixture of sand and coquina shell from stockpile to screening plant hopper. It scoops a load equal to two fair-sized truck loads, swings it almost a city block, and can dump it atop a 7-story building. The 7400 is believed to be the world's largest dragline in stockpile service and the first doing clamshell duty. (67)



● Torque converter drives are now offered in the model HA and HAH front end shovel loader made by the Hough Co. The HAH (shown) also has power steering, a 24 cu. ft. payload capacity and an 18 cu. ft. struck capacity. (68)





● Heavy shock loads and severe strain are found in this wet-mill installation for pulverizing brick, stone and clay. The multiple V-belt drive, by Worthington, uses 12-groove, QD sheaves, 9.2 to 36 in. size, driven by 40 hp motor. The Goodyear V-belts have alligator fasteners. (69)

● Totally-enclosed and fan-cooled, these Belgian-made motors are designed especially for out-door applications and dusty or fume-laden installations. Built to NEMA specifications, Type AK has a single cast-iron frame construction and one-piece aluminum fan. (70)

● Useful for miscellaneous quarry and pit duties, this low-cost International Harvester ½-ton pickup is new from bumper to bumper for advanced riding and performance features. It has a high-compression engine, syncromesh transmission, double-acting shock absorbers, "soft" springs, maximum handling ease, etc. (71)

● Henderson's new "Chief" lime and fertilizer spreader combines economy of operation with quality construction, the firm says. It has a powerful conveyor drive, a dependable distributor assembly, heavy-duty conveyor chain, a 5½-in. clutch, two-speed transmission. A 23-ft. wide spreading attachment is available. (72)

For Rugged Dependability... It's SECO Vibrating Screens!

Photographed at Dock 8 Installation, Cleveland Slag Co., Jones & Laughlin Steel Plant

Well Known Operator Finds SECO Means BETTER SIZING!

Whether it's for screening and sizing block plant material at the Dock 8 plant . . . or for making eight sizes to meet OHIO State Highway Dept. specifications at the Corrigan-McKinney plant . . . a total of eleven Seco screens are on the job at this modern Cleveland installation. There's a year by year record of dependable performance behind this preference for SECOS by leading slag producers.

Call it smooth operation . . . call it high, accurate production . . . or low maintenance. It's *all* of these in combination that make Seco vibrating screens *first* choice of progressive firms.

HOW ABOUT YOUR SCREENING PROBLEMS?
Take time now to find out how you can increase production and improve accuracy with the right Seco screens on your job!

SECO
TRUE CIRCULAR ACTION
VIBRATING SCREENS

OVER 350 MODELS

Single, Double, Triple and 3½ Decks. There's a right Seco for every screening requirement, from Ag-Lime to Rip-Rap. Write for your copy of Seco Catalog #203.

SCREEN EQUIPMENT CO., INC.
Buffalo 25, New York

another Kennedy Giant

Goes to Construction

HIRAKUD

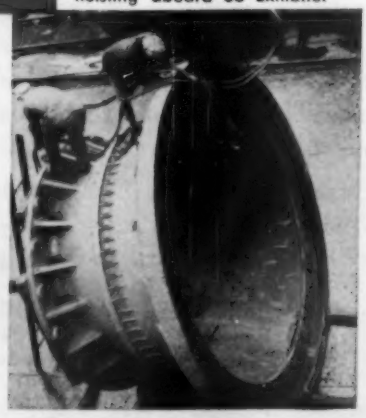
62,800 lb. shell section of KVS Gyratory Crusher being hoisted aboard SS Exhibitor for shipment to India.

The second KVS Gearless Giant Gyratory Crusher has been shipped to India for use in the construction of the Hirakud Dam. When completed, this dam will form a reservoir covering an area of 600 million acre feet.

KVS machinery for cement manufacture, lime production, mining and crushing is in use throughout the World. KVS engineers are available for consultation *anywhere* to assist in solving construction problems.

We furnish anything from a crusher to a complete cement, lime crushing or mining plant. Before you specify . . . consult KVS and be *sure!*

Riggers readying shell section of KVS Gyratory Crusher for hoisting aboard SS Exhibitor



IT COSTS LESS . . . TO OWN THE BEST!

Gyratory Crusher

India for
Work on

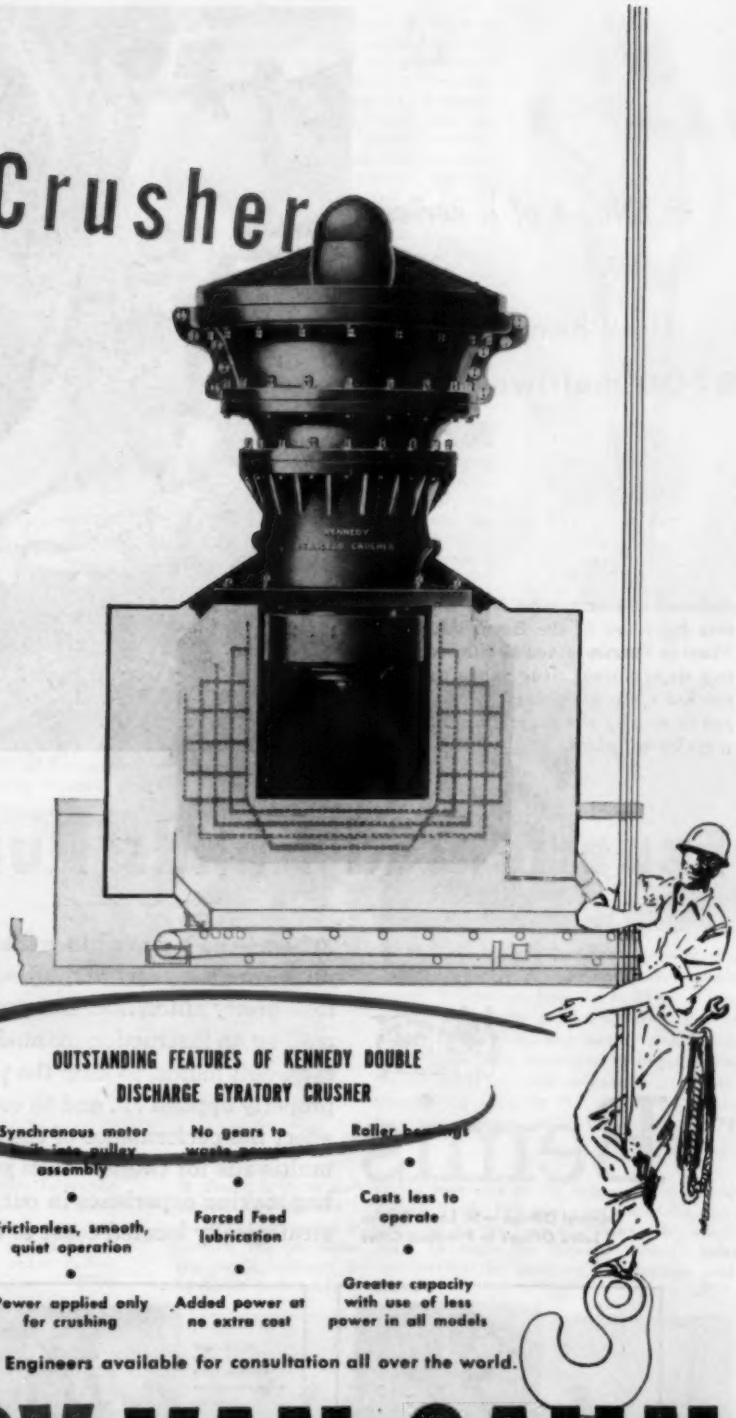
DAM

More Tonnage At Lower Cost

...with the NEW KENNEDY GYRATORY CRUSHER

Greater production . . . more uniform sizing . . . in less time. That's the result with the new KENNEDY Gyratory Crushers. DOUBLE DISCHARGE outlets handle all types of rock containing as much as 50% clay *without sticking!* NO other crusher approaches this performance.

Lower operating cost . . . less maintenance and more crushing power per kilowatt! The synchronous motor is built into pulley assembly . . . power used only for crushing . . . no gears to wear! NOTHING performs like a KVS crusher but its duplicate. For peak capacities at lowest operating costs, KVS crushers have no equal.



OUTSTANDING FEATURES OF KENNEDY DOUBLE DISCHARGE GYRATORY CRUSHER

Synchronous motor built into pulley assembly	No gears to waste power	Roller bearings
Frictionless, smooth, quiet operation	Forced Feed lubrication	Costs less to operate
Power applied only for crushing	Added power at no extra cost	Greater capacity with use of less power in all models

Send for bulletins describing all KVS crushers. Engineers available for consultation all over the world.

KENNEDY-VAN SAUN

MANUFACTURING & ENGINEERING CORPORATION

TWO PARK AVENUE, NEW YORK, N. Y. • FACTORY: DANVILLE, PA.

No. 4 of a series

How Bemis makes GOOD multiwall bags for you

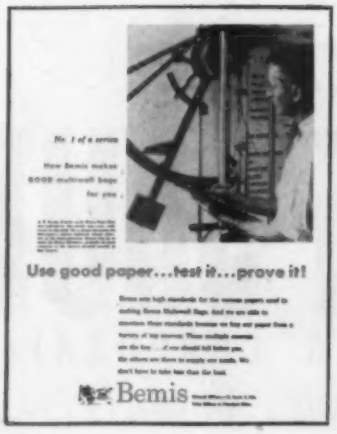
Herman Johnson, who is in charge of this big tuber at the Bemis Multiwall Plant in Peoria, joined Bemis in the tubing department nine years ago and worked up to his present capacity. His job is one of the most important in a multiwall plant.

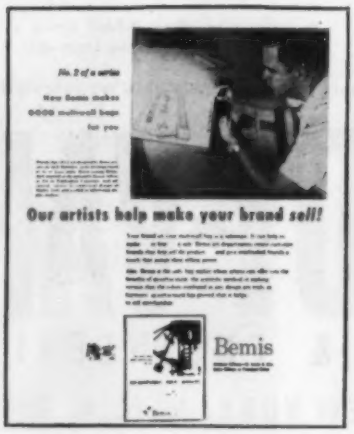
Experienced Hands Run Our Tubers!

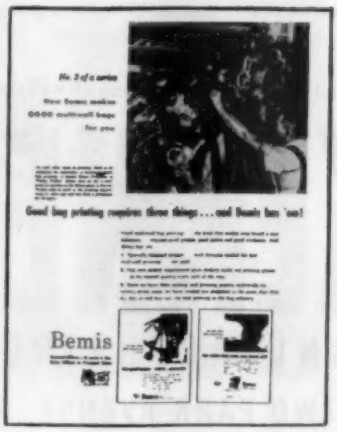
Bemis

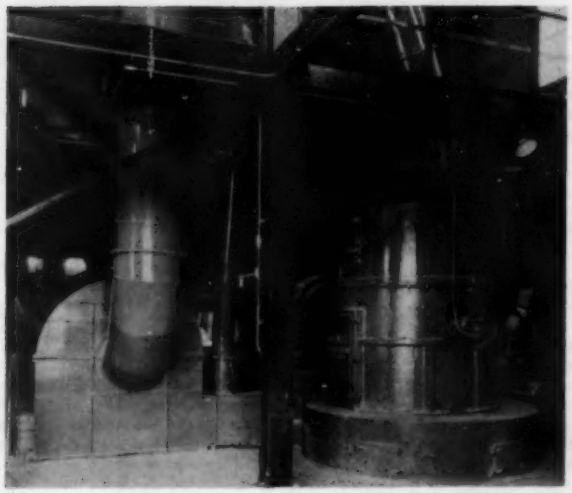
General Offices—St. Louis 2, Mo.
Sales Offices in Principal Cities

Tubers—the big machines that fold and paste the multiple kraft plies—are the heart of multiwall bag making. Running, they look pretty automatic. But you don't learn to run a tuber by reading an instruction manual. It takes long experience, knowing eyes, deft hands, to keep the plies properly nested and paste properly applied . . . and to control the many other factors that affect the performance of the finished bag. We've been making multiwalls for twenty-seven years . . . so there's plenty of bag-making experience in our twelve multiwall plants strategically located coast to coast.



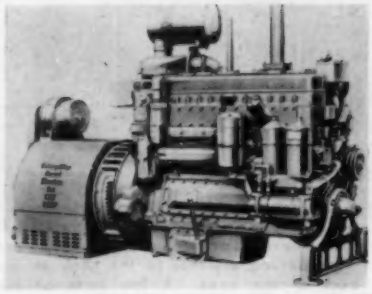






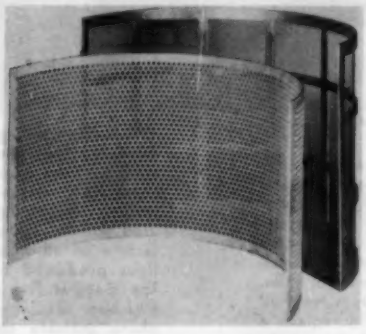
● Using the basic designs of the well-known Bradley Hercules screen-type mill, a new line of air-swept pulverizers have been developed by Bradley Pulverizer Co. for grinding nonmetallic materials. Made in various sizes, each unit engineered to the user's needs, the mills will reduce to finenesses ranging from 20 to 325 mesh as required. The unit shown here reduces 14 tph of Florida phosphate rock (90% concentrates and 10% pebble) to a minimum finess of 90% passing 100 mesh. Set up at floor level, for minimum installation costs, the mill and the fan are readily accessible for maintenance. (73)

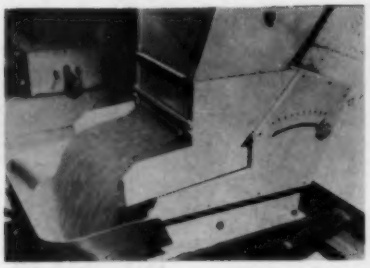
● This highly versatile and readily adaptable pneumatic conveying unit for handling bulk materials has been introduced by Sprout, Waldron & Co. It is a negative pressure, or draw through system, with fan located on the opposite side of the collector from the conveying line. A rotary vane feeder valve forms the base of the long-cone collector. No material passes through the fan, and the Pneu-Vac is self cleaning. Built in 12 standard sizes, with fan motors from 2 to 60 hp, the system is handling varied products with capacities to 50 tph and more in multiple systems. (74)



● New higher rpm continuous ratings for Cat D337 and D326 engines and electric sets have been announced by Caterpillar Tractor Co. They are now available for continuous 24-hour operation at 1800 rpm. The D337 (left) now has an output of 110 kw at 1800 rpm when externally regulated, and 103 kw when self regulated. Continuous 12-hour service under the new rating gives it a 124 kw output (externally regulated) and 117 kw (self). (75)

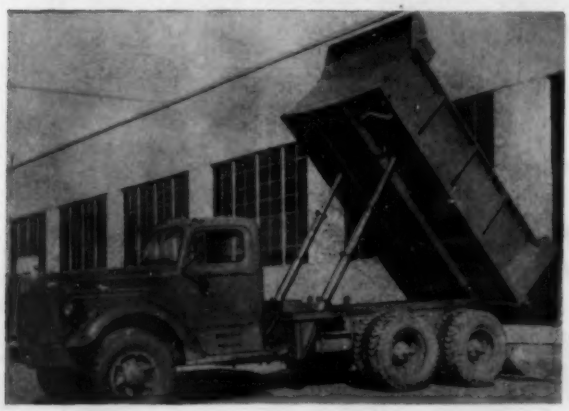
● New higher alloy steels are now being used to produce screens having even greater service life, Standard Stamping & Perforating Co. says. The firm makes all sizes and styles of hammermill screens, vibrating and shaking screens, etc. (76)



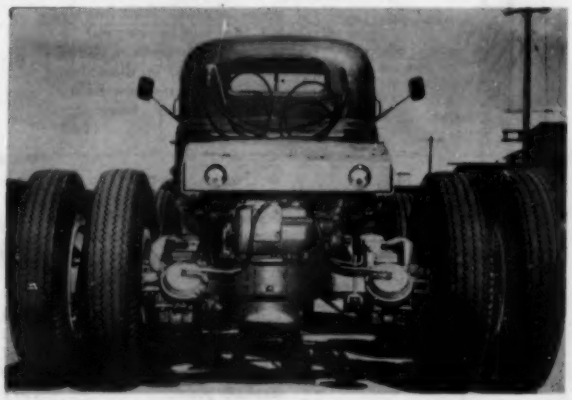


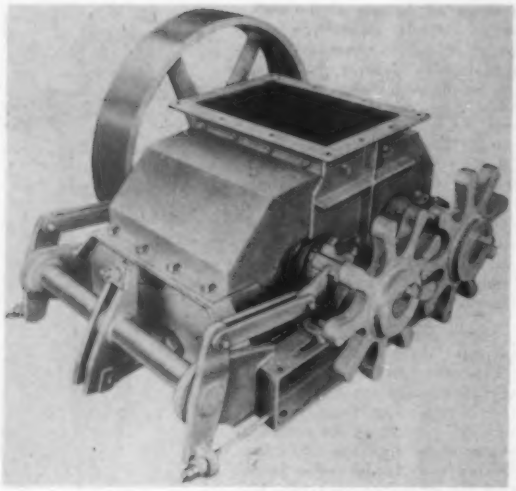
● Richardson Scale has this new vibrating solids feeder with an extra-wide output range. It produces from 0.1 to 20 cu. ft. per minute of granular products, takes up little space (28x17x19-in.) and uses a 1/8 hp motor. Based on designs developed in England, the feeder works at 1850 vibrations a minute, transmitting little to the structure. It can feed five degrees uphill if desired. (77)

● Designed to carry more load on the front axle, these Teleramic twin telescopic hoists and dump bodies announced by the Anthony Co. are matched units of lightweight construction. A self-contained subframe takes the load of the body and protects the chassis frame. Hoists have capacities ranging from 10 to 26 tons under bodies 11 to 13 ft. long with 6 to 15 yd. capacities. (78)

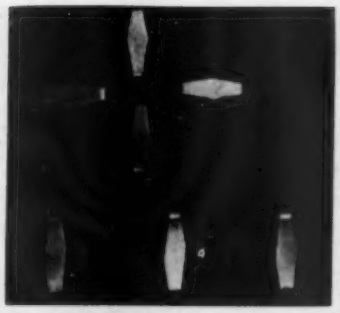


● Power is given only to the rear axle of the tandem assembly in Reo Motors new 6 x 2 tandem truck. This rear view shows the top-mounted, two-speed transmission on the rear or driving axle, which permits the propeller shaft to clear the forward "dead" axle. Weight is reduced by eliminating the auxiliary transmission and by the overall tandem assembly. (79)



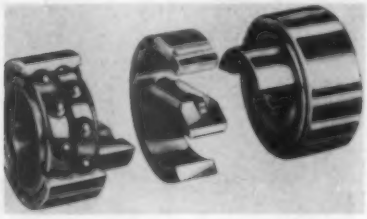


● Designed to reduce lime, cinders, coal and materials of like crushability, this Black Diamond double-roll crusher has been introduced by McLanahan & Stone. Various sizes have roll diameters from 18 to 36-in. and lengths from 18 to 60-in. Backing the movable roll is a unique linkage system incorporating a curved cast iron adjusting block that serves as combination tramp iron protection and adjustment device. Special steel gears with extra long teeth permit crusher opening adjustments up to 3½-in. Accurate product size results from the non-fluctuating roll opening. **(80)**



● Speedy belt repairs are performed with these Clip-A-Rip clips developed by Three Point Belt Lacing Co. Driven into the belt by a hammer, their specially designed teeth pull ripped sections together and hold tightly in place pieces inserted to replace gouged or burned sections. Packed 100 to a box, Clip-A-Rip clips come in two sizes: for belts ½-⅝-in. and ⅝-⅞-in. thick. **(81)**

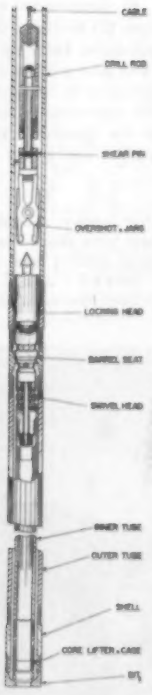
● This device transmits torque in both clockwise and counterclockwise directions, while preventing reverse torque action or kickback. Called Nobak, it is also used to lock a driven mechanism in any angular position. Used on many military machines, it is now available to civilian industry from Ahlberg Bearing Co. (below). **(82)**



● Rubber sleeves are clamped quickly and securely to hydraulic pipe with Black Bros. chain sleeve clamp. The chain wraps around the pipe and attaches to the hook on the back of the head. A few turns of the swiveled pressure handle creates a leak proof joint. The standard clamp fits all pipe 6 to 30-in. ID. **(83)**

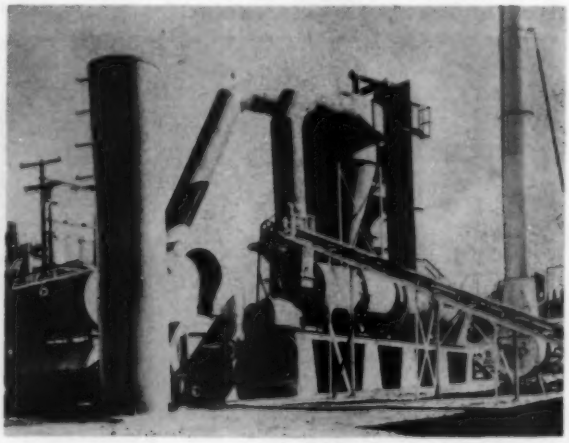
● Called the strongest fabric ever devised for tire carcass construction, Nygen cord is now being used in the manufacture of all giant tires produced by The General Tire & Rubber Co. The photo indicate the range of the General giant tire line, from 12.00x20 to 27.00x33. **(84)**

● Double grouser track shoes developed for Caterpillar D8 tractors working on rock and other hard surfaces have a very high resistance to bending and a much larger wear surface for longer service. **(85)**



● Promising a revolution in exploratory drilling, a new tool and technique devised by E. J. Longyear Co. successfully applies the principle of the wire line core barrel to the drilling of small diameter diamond core drill holes. The string of drill rods is removed from the hole only to replace a core bit. Cores and inner tube are lifted out through the inside of the drill rods by a wire line cable reel that returns an empty tube in a fraction of the time required for the round trip with conventional equipment, Longyear says. The core barrel has a ball-bearing, swivel head and an optional water shut-off that largely eliminates the human element in detecting a core block. Cores are about 1-1/16-in. in diameter. Depths of 5000 ft. are now being drilled. Patents have been applied for. **(86)**

● Two horizontal and one vertical scrubber feature a compact asphalt plant wet-washing system shown at the left of the photo. Built by Standard Steel Corp., the system is complete with horizontal spray chambers, vertical scrubber, duct work from fan and manifolded spray chambers. It requires a very small amount of water. It can be used with any asphalt plant. **(87)**



FULL VISION means you'll Move More with a MICHIGAN

Step into a MICHIGAN* cab, and sit in the operator's comfortable seat. Notice how easy it is to follow every move on the job. 3604 square inches of glass!—see what excellent vision is provided, in all directions and overhead.

Here, indeed, is a masterpiece of smart modern design: a truly functional cab—fully ventilated, quiet; a comfortable cab designed to make the operator's job as easy as possible. Look, also, at the outside of the cab; at the adjustable louvers on both sides for good ventilation; the sliding rear doors that make it easy to get at the engine; the rear window to complete the full-vision facility.

For an easy point-for-point comparison of the MICHIGAN with other machines, send for the MICHIGAN Fact Folio: contains full information, including an interesting book "More Yardage Through Air Power." The coupon gets prompt action.

**A Trademark of Clark Equipment Company*

CLARK EQUIPMENT

CLARK EQUIPMENT COMPANY
Construction Machinery Division
450 Second Street, Benton Harbor, Michigan

Please send the MICHIGAN "24" Fact Folio

Name_____ Title_____

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Screenings

by Ray L. Smith, Jr.

AN AFFAIR of teen-age honor came to light when a youth was seized, some weeks back, after he fired several shots at a posse of 40 police and firemen searching a gravel pit near South Elgin, Illinois. He had been waiting 20 hours to fight a rifle duel with a friend. The lad told police he and the friend had engaged in a free-for-all over, you guessed it, a girl. They finally agreed "The only way to settle this is with rifles. You start at one end (of the gravel pit) and I'll start at the other, and only one of us will leave." Upshot of the whole deal was that the friend proved to be not in earnest by going swimming instead of keeping the prearranged date, thus leaving the youth waiting at the gravel pit.

This little item could be considered humorous were it not for the terrifying thought that, if such a thing should reach epidemic proportions, our gravel pits would, in a few years, become so full of lead that the screen manufacturers would be forced to redesign their equipment to take care of the increased weight. If some dark night you walk into your "diggin's" and are greeted with a hail of shot—think nothing of it, it's just Junior practicing up for tomorrow's duel.

With a Heart of Feldspar

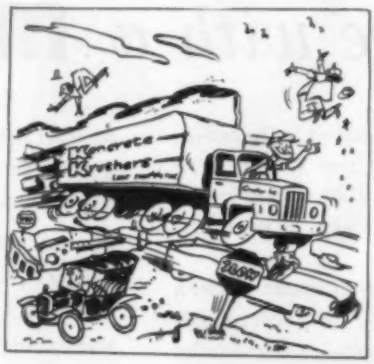
IT TAKES a good man to make fun of himself. In case you don't have it, here is how a credit man describes a credit man. "Past middle age—spare, wrinkled, intelligent, cold, passive—noncommital, with eyes like a codfish, polite in contact, but unresponsive—cool, calm, and damnably composed as a concrete post—a human petrification with a heart of feldspar and without charm or the friendly germ, and minus a sense of humor." This may describe a few whip-crackers found in stores that sell "borax" on the installment plan, but certainly with respect to the average high-level company — *tain't so*. The modern credit manager is friendly, sympathetic, not a bone-crusher. He leans forward as far as common sense will permit. Exceptions? Yes, life is full of them.

Speed Demons

"LARGE Truck Collapes Fayette County Bridge" is the headline on a press clipping just received from the Cedar Rapids, Iowa, Gazette. It seems, the truck, loaded with concrete blocks, was traveling so fast, its speed and weight carried it across a large steel bridge, collapsing the structure so it cannot be repaired and will have to be replaced.

This juicy item emphasizes one of our particular beefs. Today's highway picture isn't a rosy one. Our highways are crowded, and it's not hard to see why. Fifty million high-powered autos are fighting for a place on a highway network which was designed for half that number of 1930-model cars.

Through all this melee, weaves the average truck driver (and this includes sand and gravel, concrete block and ready-mixed delivery trucks), his foot on the accelerator, urging the wild, eager, impatient horses beneath the hood, to be off. It's easy to understand why the above mentioned truck did not go down with the bridge.



Isn't it enough that an increasing highway accident rate is arising from our outdated highway system, without tempting fate further by faster driving? Why can't we all slow down a little—on the road, as well as in our business activities. The open road is a thing of the past.

Wild idea just hit our lower-level mind. Why not hire drivers, with concrete-block-loaded-trucks, to go dashing all over the country, ripping down bridges. This would not only give the boys an outlet for blowing off steam in forty-eleven directions, but, it might, also, start the ball rolling against the intolerable conditions of most of our highways. Could be, some genius might come up with an idea for ripping up the roads between bridges.

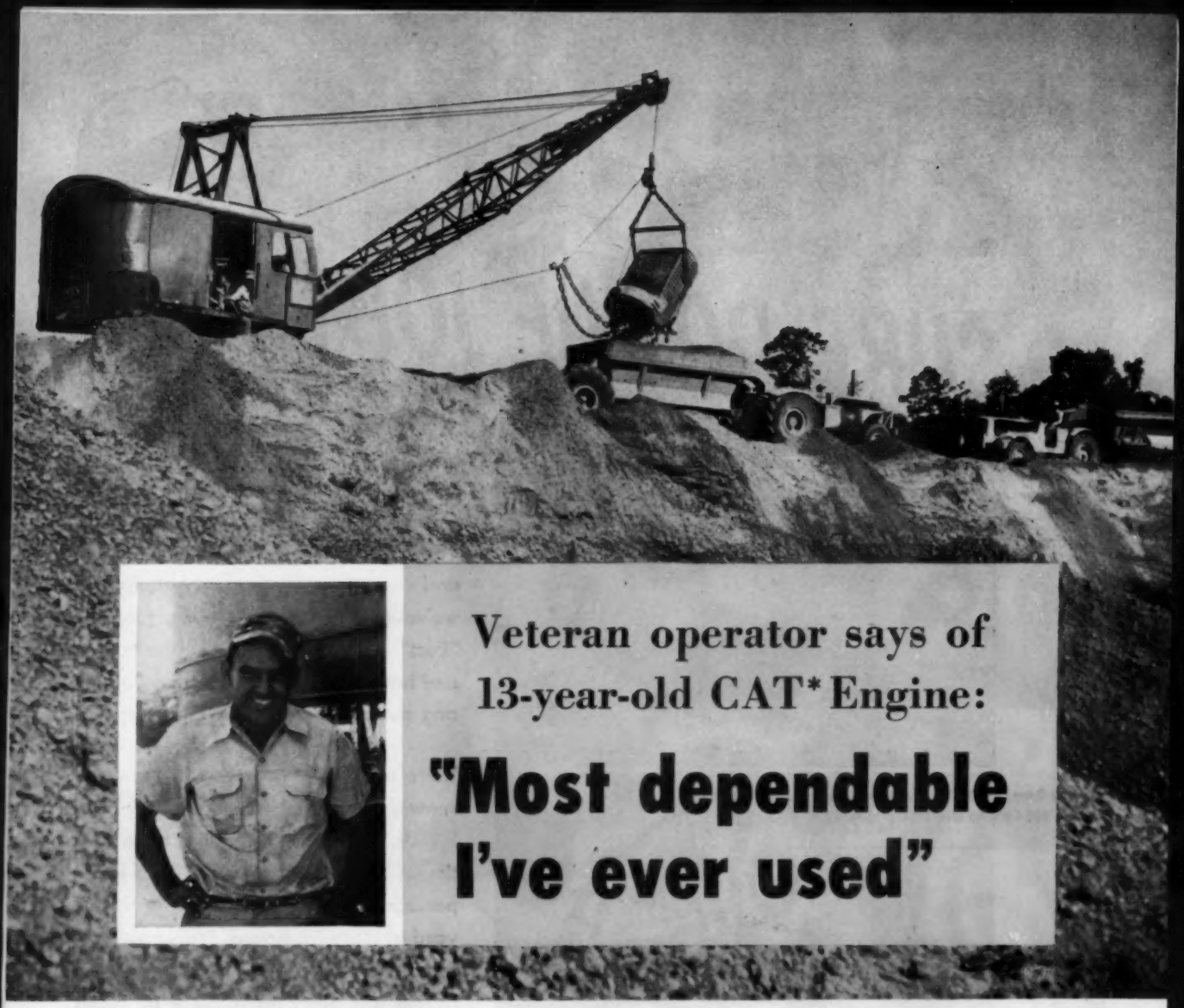
For fear we won't have nerve enough to use it later, here's an item. It could be called a joke. A husband and wife were having their monthly sweat over bills and income. "If we could only figure out what the problem is," said he, "we might be able to . . ." "Huh, I already know what the problem is," snorted the wife. "It's having too much month left over at the end of our money."

Feminine Viewpoint

"MEN are lousy bosses," writes a lady in an article we read recently. She calls herself Anonymous, so we can't fight back. A lot of girls know that men in general stand up for them in business, but we for one are getting tired of secretaries who take our money and then nail us on the barn door. "Miss "A" (or Mrs.) ends the lament with her four requirements for a good boss. She has looked for such a man 15 years. (1) He must be happy with his wife. (2) He must be interested in, and good at, his own job. (3) He must not be too good looking. (4) He should have been poor once and remember it.

Culturally and intellectually, Miss "A" is a peasant. Everyone knows that, from the female point of view, no mere male could possibly be endowed with all the attributes necessary to make them think he is anything but a miserable half-wit. She will probably spend another 15 years looking for the perfect boss, then wind up by marrying some oaf and try to keep him from going to hell in a basket, with her tact and wisdom.

Having worked with many executives, we can truthfully say that 95 per cent of them treat a secretary with patience, courtesy, and no wrong ideas. How do you rate?



Veteran operator says of 13-year-old CAT* Engine:

"Most dependable I've ever used"

"I've been with this machine for three years, and an operator for 16 years," says C. S. Batson, operator for Reynolds and Williams, Little Rock, Ark., "and Cat Engines are the most dependable I've ever used." He is shown here with a Northwest Shovel whose Caterpillar D13000 Engine is 13 years old.

The shovel loads out five Caterpillar DW10s and W10 Wagons, 20 loads of base gravel per hour, for an 11-mile stretch of State Highway No. 4 near Little Rock. In one 21-day period, the company put down 35,000 cu. yd. on this stretch. The shovel strips topsoil for three hours, and then loads gravel for 10 hours every day. Output is 360 cu. yd. of topsoil and 1800 cu. yd. of red clay gravel daily.

That's high production for a shovel whose engine is a veteran of more than 40,000 hours. All Caterpillar Diesels are built to deliver many thousand hours of economical, pamper-free performance, thanks to such features as specially hardened crankshaft journals and long-lived aluminum alloy bearings. Really efficient filters and seals protect every engine's factory-built precision, even in abrasive dust working around rock. Important in cutting costs is the ability of every Caterpillar Diesel to deliver full and *foul-free* power on inexpensive No. 2 furnace oil.

There are 12 sizes of Caterpillar Engines and Electric Sets, to 500 HP and 315 KW. Leading manufacturers can supply Caterpillar power in their excavators, compressors, with rock crushers and other machinery. Your Caterpillar Dealer — who provides fast service and genuine factory parts — can help you select the Cat power unit that will do most work at lowest cost for *you*. Call him today.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR*

*Both Cat and Caterpillar are registered trademarks—®

SPECIFY CAT POWER FOR HIGH-PROFIT PERFORMANCE

"Eucs"

SURE DO THE JOB!

Euclid Scrapers—12, 15.5 and 18 cu. yds. struck...180 to 400 h.p. engines... top speeds, loaded to 30 m.p.h.

Bottom-Dump Euclids—13, 17 and 25 cu. yds.... 180 to 300 h.p...top speeds loaded to 35 m.p.h.

Rear-Dump "Eucs"—10, 15, 22, 34 and 50 tons ...125 to 600 h.p...spring mounted or semi-rigid drive axles...top speeds loaded to 36 m.p.h.

On construction and mining jobs the world over you'll hear owners say, "those 'Eucs' make more money for us and do more work than any equipment we've ever used." Operators, too, like "Eucs" because they're easy to handle and have plenty of what it takes to haul and dump big loads in tough going.

There are lots of reasons why men who know earth moving equipment specify Euclids, but they all add up to one simple fact . . . "Eucs" move more loads per hour at the lowest cost per ton or yard of material moved. Profitable performance on all types of work is proved by the fact that over 60% of all Euclid equipment sold is repeat business from satisfied users.

When competitors are using "Eucs" to move dirt or rock faster and cheaper than you are, you can't afford to pass up the cost cutting advantages you get in Euclid equipment. For the recommendations of a hauling equipment specialist and a production and cost estimate on your job, get in touch with your Euclid distributor . . . there's no cost or the slightest obligation.

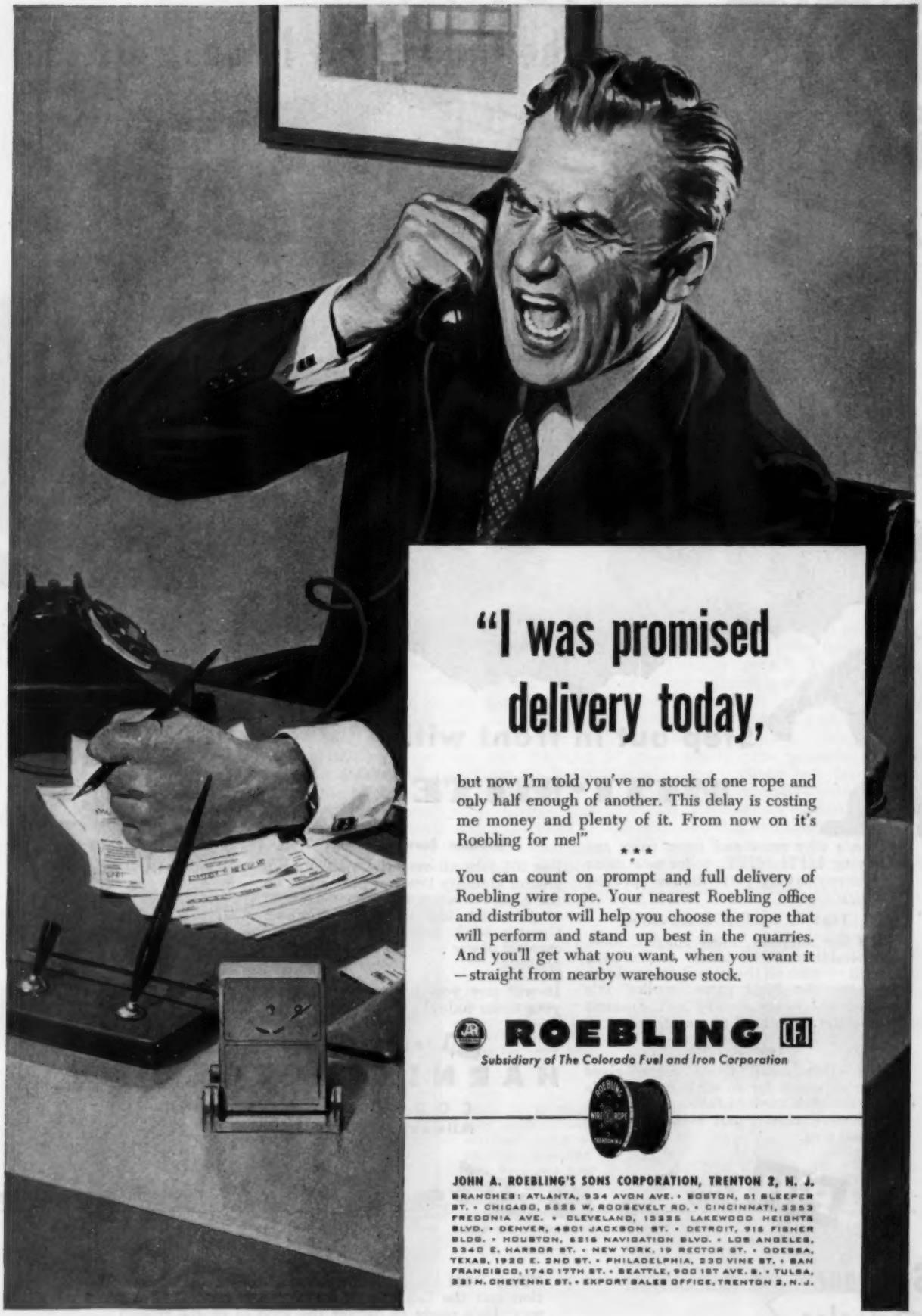
EUCLID DIVISION GENERAL MOTORS CORPORATION, Cleveland 17, Ohio

EUCLID THE PIONEER

Euclid Equipment

FOR MOVING EARTH, ROCK, COAL AND ORE

GM GENERAL MOTORS



"I was promised delivery today,

but now I'm told you've no stock of one rope and only half enough of another. This delay is costing me money and plenty of it. From now on it's Roebling for me!"

* * *

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WEST TEXAS SAND and GRAVEL FIRM Opens Modern 300 T.P.H. Washing Plant

another ON THE SPOT report

AT a site about 11 miles north of Hamlin, Tex., (at Flattop) the Hamlin Sand and Gravel Company operates one of the most outstanding, new sand and gravel plants in the United States. Producing at

By KENNETH A. GUTSCHICK

General view of the new 300 t.p.h. washing plant of Hamlin Sand and Gravel Co., Hamlin, Tex., one of the most modern plants in the industry. About two-thirds of the output is shipped by rail.

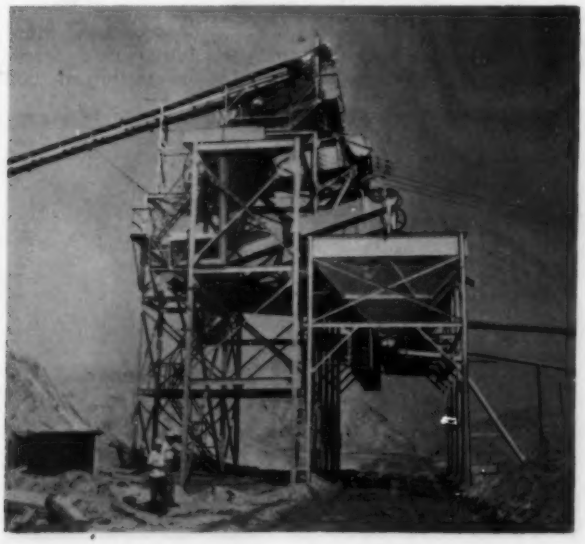
a clip of about 300 t.p.h., the plant turns out a complete range of washed and unwashed specification materials ranging from 1½-in. gravel to mason sand. The products are marketed within a 150-mile rail-shipping radius and a 60-mile trucking radius of the plant.

The new plant features a complete array of the latest sand and gravel processing equipment, which assures the production of exceptionally clean aggregates. Started in January of this year, the plant was constructed on the site of a 25-year-old operation, that of the More and Moore Sand and Gravel Company. This older operation was taken over by the present owners in 1947 (J. W. Maddox and W. M. Blackburn), who operated it until the latter part of 1953, at which time the plant, having reached obsolescence, was torn down.

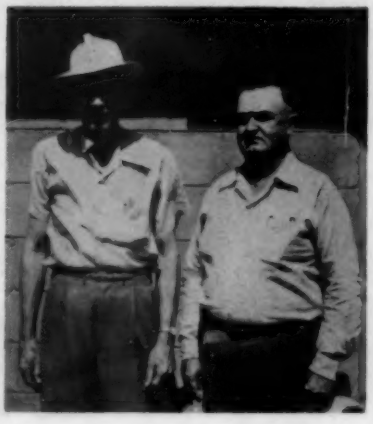
The present operation consists of a dry plant (used in the production of hot-mix materials) and the new wet plant. The latter unit, which was designed by Eagle Iron Works, features the use of a double log washer, a sand settling tank, and three single-screw classifier-dehydrators (one for pea gravel, one for concrete sand, and one for mason sand)—all of Eagle manufacture. In addition, there are two vibrating screens which round out the facilities of the washing plant.

This all-steel plant features the use of walkways and stairs built of perforated steel plate. This material, which is commonly used in the construction of oil refineries, provides good footing since water drains rapidly from its surface. The plant is elevated sufficiently above the track level (about 60 ft.) to permit gravity transfer of materials to the various processing units. The pit-run gravel reaches the primary screen *via* a long inclined belt conveyor. The plant has centrally-located push-button controls for operating the various washing and classifying units.

The pit* is situated in a former stream bed about one mile from the



Left: Closeup of the all-steel washing plant, showing the sand-processing units in the middle foreground. Trucks and rail cars are loaded from the same bins.



Right: W. M. Blackburn, secretary-treasurer (left) and J. W. Maddox, president, who have operated the plant at Flattop since 1947; they built the new washing plant late in 1953.

*An interesting sidelight of the pit concerns the presence of fragmentary fossilized elephant (mammoth) bones and teeth; a photo of one of the teeth is included here. The fossilized remains are evidence of huge elephants (even larger than their modern counterparts) roaming the Texas plains during the glacial age and earlier.

Sand and gravel is obtained from a 7-ft. deposit by the cut-and-fill method; a 1¼-cu. yd. dragline is used for overburden removal and a 1½-cu. yd. dragline for truck loading. Note the spoil bank on the left.

Double Mountain Fork of the Brazos River. The deposit of sand and gravel averages 7 ft. in thickness, and is topped with about 4½ ft. of clay loam overburden. The conventional cut-and-fill method is used in the pit operation, each cut averaging about 20 ft. wide by 500 ft. long. With this method the overburden from one cut is cast over into the adjacent cut from which the gravel had earlier been removed. A Northwest No. 4 dragline is used on overburden removal, and a Koehring 501 dragline on truck loading of gravel. Both draglines are diesel-operated and fitted with Hendrix 1½- or 1¼-cu. yd. buckets, the smaller of which is used on overburden. A fleet of six Dodge and Ford 4-wheeler dump trucks are used for the one-mile haul to the plant; loads average 5 cu. yd. each.

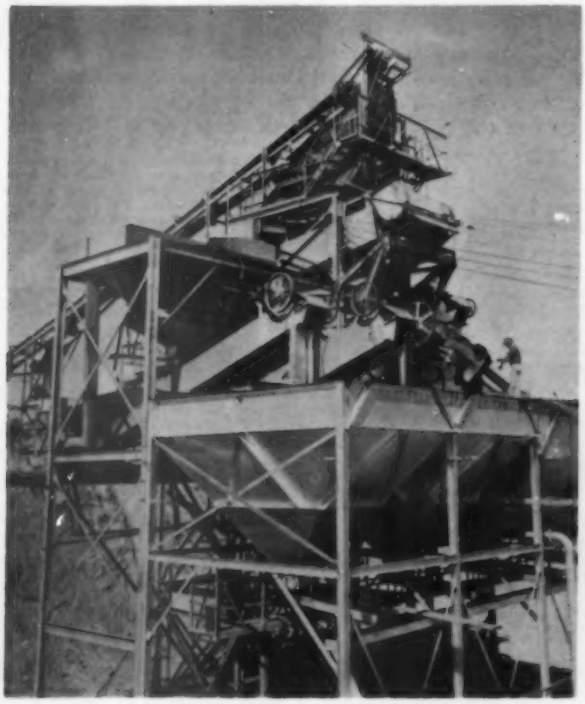
Material is discharged into either of two underroad hoppers—one a 25-cu. yd. steel hopper serving the dry plant and the other a 60-cu. yd. concrete hopper serving the wet plant. Delivery belts issuing from each hopper are fed by Pioneer reciprocating feeders, which are driven off the tail pulleys of the conveyors.

Closeup of the head pulley drive of the main 24-in. by 260-ft. belt conveyor, which delivers pit run material to the washing plant.

Gravel for hot-mix asphaltic concrete is produced in the dry plant on a Seco 4- by 12-ft., 2-deck screen, which is fed by a 24-in. by 50-ft. belt. The top deck is fitted with wire cloth having ¾- or ½-in. openings, and the bottom deck with ⅛- and 1/16-in. openings. The desired product (off the bottom deck) is then conveyed to stockpile on an 18-in. by 80-ft. belt conveyor. Undersize and oversize fractions join and are cross-conveyed to the main belt feeding the washing plant, the fines cushioning the belt from the fall of the oversize.

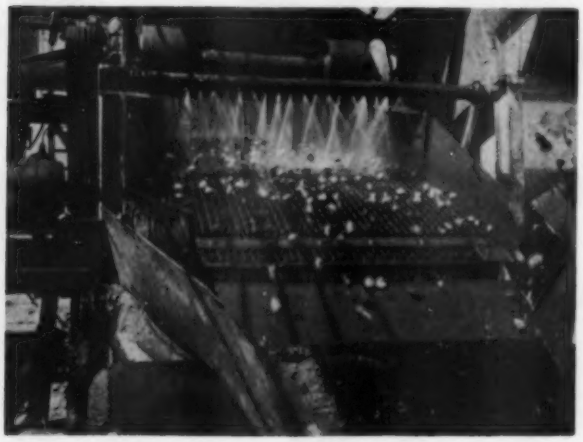
The main delivery belt conveyor is a 24-in. by 260-ft. unit made with Pioneer idlers and pulleys and fitted with Goodrich 5-ply belting. The belt is driven at 300 f.p.m. by a 40-hp. motor through V-belts and a Dodge Torque-Arm speed reducer. The latter unit is very compact and eliminates the use of a flexible coupling; it also provides easy belt adjustment.

For primary screening a Pioneer 4- by 12-ft., 3-deck screen, fitted with water spray bars is used; water is supplied to the screen at 600



Left: Oblique view of the washing plant. Note the sand tank (left) and the two sand screw classifiers in the foreground.

Below: A 4- by 8-ft. two-deck screen sizes the gravel.



Two of the three screw classifier-dehydrators used in the washing plant. Left: the 24-in. by 15-ft. pea gravel screw. Right: the 36-in. by 25-ft. screw which produces concrete sand at 90 t.p.h.

g.p.m. Wire cloth openings on the top deck are 1¾ in.; on the middle deck, 7/16 in.; and on the bottom deck, ⅛ in. in one section and 3/16 in. in the other. Oversize, amounting to less than 2 percent of the total feed, is chuted to a waste bin. Material off the middle deck is fed to a double log washer, that off the bottom deck to a pea gravel screw classifier, and that through the bottom deck (the sand particles) to a water scalping tank mounted ahead of the two sand screw classifiers.

The log washer is an Eagle Model C 7- by 24-ft. twin-paddle-type unit. The paddles, made of Ni-hard, are rotated at 32 r.p.m. by a 75-hp. motor. Approximately 100 g.p.m. of water is used in the unit. Following washing, the gravel is chuted to a Deister 4- by 8-ft. double curved-deck screen, also fitted with water spray bars. This screen, which uses 300 g.p.m., makes two sizes of gravel. Normally ¾- or ⅞-in. openings are used on the top deck and No. 8-mesh on the bottom deck, the latter serving mainly to dewater the material. The two gravel sizes are chuted direct to bin storage; however, provision is also made to blend the two sizes into any desired proportion by means of a split chute and an adjustable gate.

Material off the bottom deck of the primary screen (minus 7/16-in. plus 3/16-in.) is chuted to an Eagle 24-in. dia. by 15-ft. standard tub single-screw coarse material washer. This unit has a combination of paddle and screw flights which are driven at 32 r.p.m. by a 15-hp. motor. Water consumption averages 300 g.p.m. After thorough washing and dewatering, the material (pea gravel) is chuted to bin storage.

Sand particles passing through the bottom deck of the primary screen are flumed to an Eagle 16-ft. water scalping tank, which has a set of five spring-loaded automatic valves, and a 3-cell collecting-blending flume with adjustable gate-type splitters. The tank serves to remove excess water but at the same time retain the needed fines; it also classifies the material. The amount of overflow is controlled by an adjustable weir. Sand classification is accomplished by the gravitational settling of the particles, the coarse particles settling out near the intake end and the finer particles toward the discharge end. After settling out, the particles are automatically bled off through the spring-loaded valves in the bottom of the tank. Each valve discharges the particles through a triple splitter into three collecting-blending flumes. Adjustable gates on each splitter control the amount of sand passing to each flume and hence to the screw classifiers. This neat arrangement permits the precise controlling of the various sizes of material produced by the tank, as well as the wasting of any amount of an undesirable size of material produced at any of the splitters. This is an important feature in view of the general tightening up of state and federal specifications of concrete sand.

Discharge from the sand tank is flumed to two Eagle long-weir single-screw fine material classifiers mounted parallel to each other; one is a 36-in. by 25-ft.unit producing concrete sand and the other a 24-in. by 25-ft. unit producing mason sand. Water is supplied to each unit at 100 g.p.m. Both units are driven by 15 hp. motors—the larger one at 21 r.p.m., the other at 32 r.p.m. Each classifier has adjustable baffle gates which control the amount of fines going out in the wash water. After dehydrating, the material is discharged direct to bin storage.

Under normal operation concrete sand and mortar sand are produced simultaneously; in this case a small amount of undesirable material is taken from the third collecting flume and piped to the waste area. However, it is also possible to use the

(Continued on page 92)

View from above the 16-ft. water scalping tank which supplies sand to the two sand screw classifiers. The tank, mounted about 40 ft. above the ground, has a set of five spring-loaded valves which automatically discharge the material to a 3-cell collecting-blending flume.

"Leave Nothing to Chance"

Motto of Successful Operator of Portable Crushing and Screening Plants

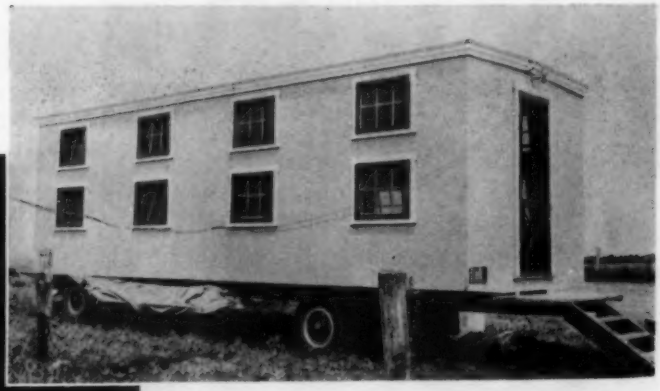
another ON THE SPOT report

ONE of the most successful operators of portable crushing plants in the country today is the firm of Edward Kraemer & Sons, general contractors with offices at Plain, Wis. In a rough-and-tumble branch of the aggregate production field which rarely allows a competitor to survive more than one mistake, the Kraemer organization has achieved in every phase of its operations a drum-tight, almost flawless efficiency well worth careful study by anyone in the quarry business today. While many of the practices which have been developed are peculiar to portable operations, every act and policy of this outstandingly successful firm stems from a basic philosophy which could with profit be emulated in any type of business with which we are familiar.

Edward Kraemer, founder and still the mainspring of the company, entered the portable crushing business 28 years ago with a single plant, which he describes as having been "hardly portable." Today he operates six fully-portable self-propelled crushing and screening units, covering at least 70 quarry properties per year out of approximately twice that number under lease. All of the prop-

General view of one of the six self-propelled portable crushing and screening plants operated by Edward Kraemer & Sons, general contractors of Plain, Wis.

The general offices of the company at Plain, Wis.



Exterior view of one of the traveling bunkhouses.

Here Mrs. Ernest Cady and daughter Greta clean up dishes in the spick-and-span dining room of No. 2 plant. Mr. Cady is foreman of the unit.

erties are in the state of Wisconsin—mostly in the midwestern portion and north along the Mississippi River. The plants are operated mainly to supply aggregates for road-surfacing projects and bridge work.

Right from the start the company adopted the practice of building its own plants around a nucleus consisting of commercial jaw crushers and vibrating screens. In the organization's own well-equipped shops at Plain are built and assembled such other equipment as the roll crushers, belt conveyors, and chassis which go to make modern portable plants. All the extensive maintenance work necessary to keep six plants and their appurtenant equipment in top operating condition is also carried on at the shops in Plain, where seven men are employed on a year-round basis.

If there is a single phase of Kraemer's operations which is emphasized more than any other, that phase is preventive maintenance. This is a matter of stern necessity in the tightly competitive situation which usually exists in road contracting, for bids simply cannot be based on the possibility of major breakdowns occurring during the operating season. To make certain that such delays do not occur to wipe out the firm's often slender margin of profit, Kraemer uses the winter months each year to disassemble, thoroughly check, and completely overhaul every single piece of operating equipment.

Apart from its main function of assuring continuous high production during the normal operating season, this practice has the additional important advantage of enabling the company to offer year-round employment to its production crews. Thus a steadier and more dependable caliber of personnel can be attracted and retained year after year than would be the case if only seasonal employment could be offered. The company believes this is an important factor in its excellent efficiency showing.

The winter overhauls are an object lesson in a kind of thoroughness which the uninitiated might characterize as bordering on fanaticism. Virtually every part of each piece of equipment is removed and subjected to the most critical inspection. If there are signs of wear, the parts are replaced on the theory that the loss of a few months' life is a small price to pay for continuous performance of the equipment at peak capacity. As part of the winter overhaul, all equipment is also thoroughly cleaned

Closeup of one of the plants being maneuvered into position for convenient loading.

Each unit has a tractor-dozer permanently assigned to it for quarry cleanup, road maintenance, and general utility purposes.

and painted. An extensive inventory is maintained of parts and supplies of every description.

Since the plants move many times each season, each of the six units comprises a complete self-sustaining production camp, including a portable bunk house and kitchen. The units for sleeping and cooking are also built and maintained in the shops at Plain.

The various plants are as self-sufficient as painstaking organization and ingenuity can make them. While a single crew does the stripping for all six producing units, each setup is entirely independent in respect to all other phases of operation.

A typical crew comprises nine or ten individuals to handle drilling, blasting, recovery, and production work in general. Each such crew includes a married couple, the distaff side of which must be proficient in operating the kitchen.

For any particular setup at a given location, the various steps are as follows. The stripping crew is scheduled to do the necessary work well in advance of the proposed move, and the drilling and blasting crew assigned to the particular plant moves to the new location so that loose stone is on the floor of the quarry before the crushing unit appears. Then the shovel and tractor bulldozer are hauled in from the previous location.

Before the plant proper is moved, the entire route is covered with an automobile to be sure that no obstacles will be encountered when the actual shift occurs. This is extremely important, since the company expects, on moves of 60 miles or less, to do some crushing at the new location on the same day—a goal, by the way, which is usually achieved. Under reasonably favorable conditions it is not at all unusual for a plant to crush 500 cu. yd. of stone at one location during the forenoon, then move 15 miles or so to another quarry deposit, and crush an additional 100 cu. yd. of stone before the end of the day.

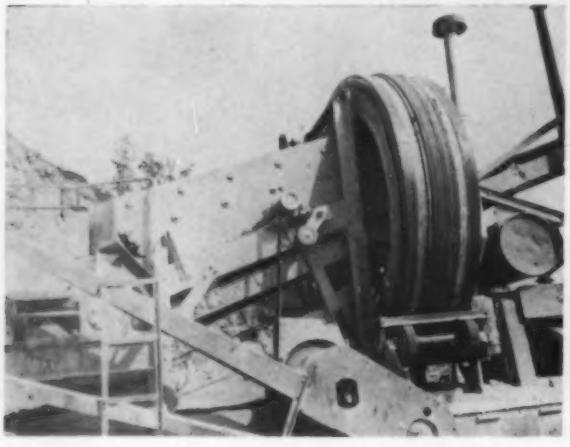
Each plant is self-propelled by its own 275-hp. Cummins diesel engine, which also, of course, provides the power to drive crushers, screens, and conveyors. A Timken rear-end drives all four rear wheels. On the open highway the average unit is capable of traveling at a speed of 18 or 20 m.p.h. On all such moves a company automobile either precedes or trails the plant as a safety precaution.

Auxiliary equipment assigned to each camp includes a shovel and general-purpose truck, a tractor-dozer for cleanup and general utility work, a wagon drill, a truck-mounted 500-c.f.m. compressor for primary drilling, a smaller compressor for secondary drilling, a portable tool house containing a generator which provides power for occasional pumping and illumination purposes, and finally, of course, the portable units which contain sleeping and eating accommodations. Four of the plants are served by 1½-cu. yd. Lorain diesel-powered shovels, while the remaining two have Northwest units of the same capacity. All the wagon drills are Gardner-Denver units, and most of the large compressors are of the same make. Caterpillar D-6 tractor-bulldozers are standard equipment for each production unit.

Four of the crushing plants are equipped with 18- by 36-in. Lippman jaw crushers for primary reduction, while two of the units have 24- by 38-in. jaws built in accordance with Mr. Kraemer's own design. All of the plants are equipped with Simplicity vibrating screens—mostly 4- by 10- ft. double-surface units. Each unit is equipped with a 3½-cu. yd. feed hopper, an apron feeder, 30-in. wide belt conveyors, a 9-ft. diameter ro-

Right: Each plant is driven as well as self-propelled by a 275-hp. diesel engine. Posed in the foreground is Clifford Schultz, foreman of plant No. 5.

Below: Closeup of the 4- by 10-ft. double-surface vibrating screen on one of the plants.



BUCYRUS-ERIE

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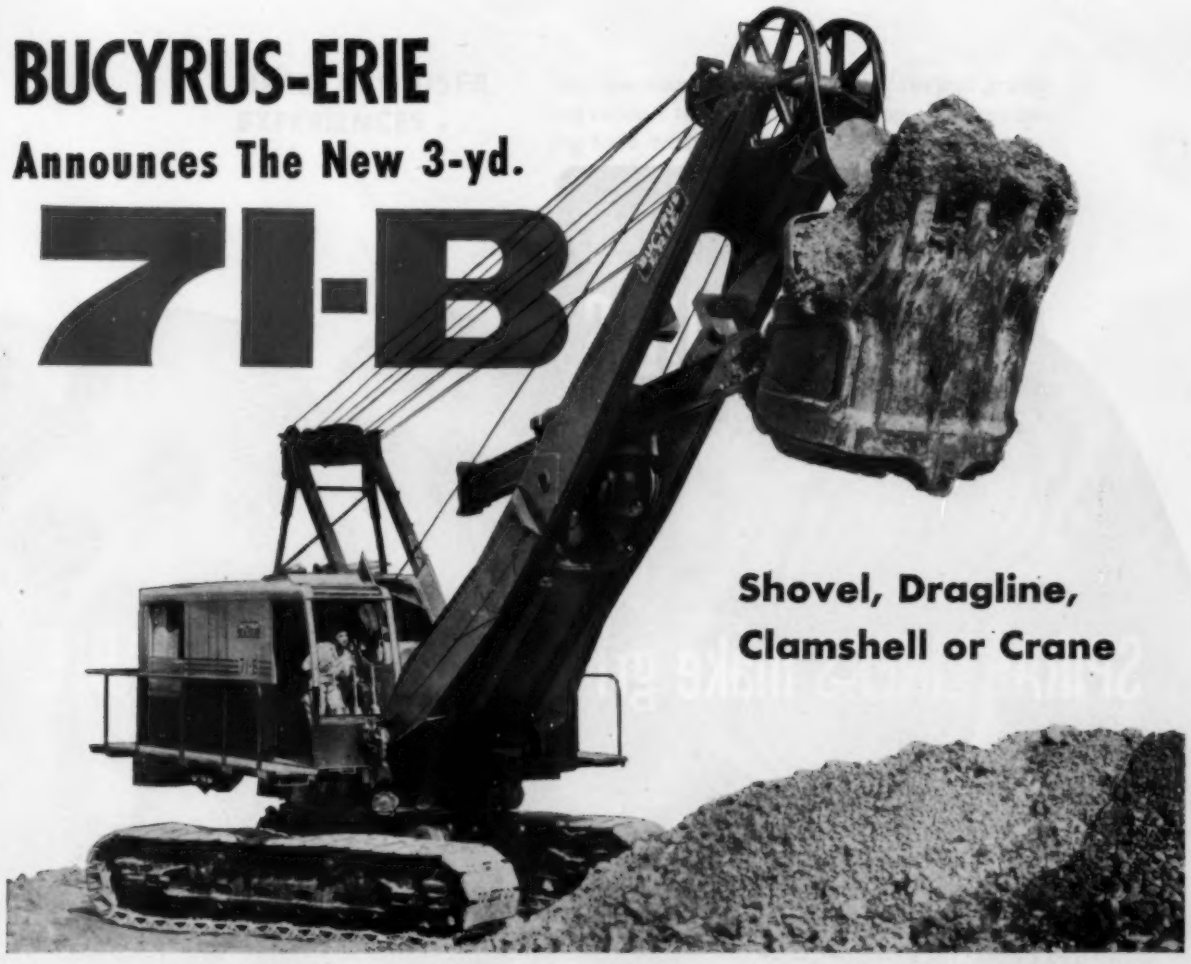

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Large balls at feed end break large particles of incoming feed. Small balls concentrate at discharge end where they utilize greater ball surface for grinding smaller particles.

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Ball charge does not fight incoming feed. Motion imparted to balls and material by spiral liners results in a low level of balls at feed end and a higher level at discharge end.

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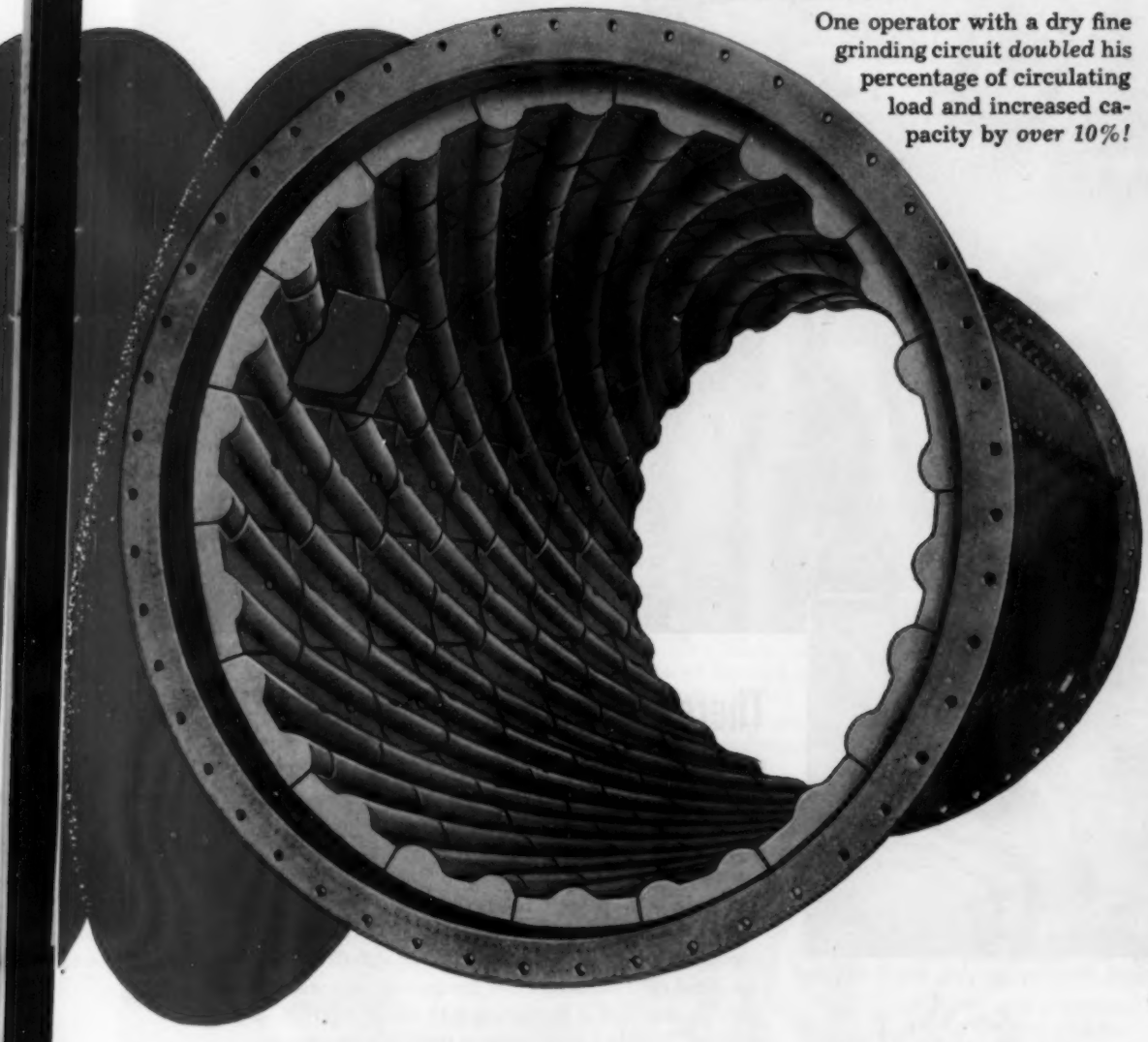

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Closeup of the 18- by 36-in. primary jaw crusher which serves one of the plants.

tary elevator, and a 5-cu. yd. truck-loading hopper.

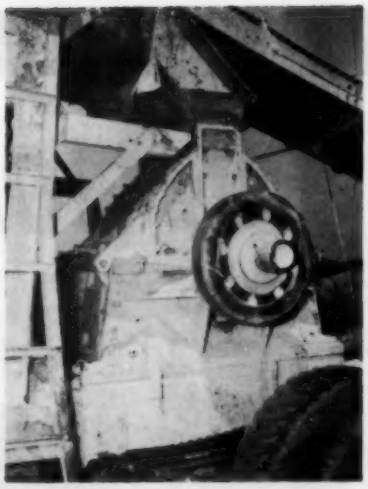
Only under the most unusual conditions is material ever stockpiled and reloaded. All but a very minor portion of total production is loaded directly from the crushing plant hopper to delivery trucks operated by a contract hauler—E. M. Koenig & Sons of Sauk City, Wis.

In addition to the facilities described above, Kraemer also operates two special-purpose portable plants—also designed and built in the company shops. One is a pulverizing unit used for the occasional production of agricultural limestone, and the other is a separating unit for the production of concrete aggregate. The latter unit incorporates a triple-deck vibrating screen, and the necessary belt conveyor and bins for making two sizes of concrete aggregate, stone chips, and agricultural limestone. The pulverizer unit is built around a Gruendler hammermill.

At need, either of these special-purpose portable units can be moved to any one of the six primary plant locations, operating in tandem with the main crushing plant as long as required. In practice, the auxiliary plants operate only about two months out of the year, compared with an average of about seven and one-half months for the primary plants.

In an average year the six Kraemer plants produce a total of from 800,000 to 1,000,000 cu. yd. of crushed stone, with the company acting sometimes as the prime contractor and sometimes as a sub-contractor, and even occasionally as both on the same project. Just as nothing is left to chance in connection with the performance of individual units of equipment, so, too, is every precaution taken to know what each of the six plants contributes to total production.

For this purpose, the main office prepares each week a detailed report on the previous week's output by each plant. This report includes the man-hours worked, the production in cu. yd., the labor efficiency in terms of production per man-hour, and the cumulative total of these data for the current year. This fairly elaborate attention to record keeping tends to keep the entire organization in high gear by generating a friendly rivalry among the various production units.



View of the pulverizer on a special self-propelled portable plant which Kraemer occasionally uses for producing agricultural limestone.

This rivalry, in combination with the firm's outstanding job on preventive maintenance, results in an average output of 10 cu. yd. per man-hour, season after season.

Each of the six plants averages about 90 cu. yd. of material per hour, although on occasion any one of the units may turn out as much as 1000 cu. yd. in a single day. For a single setup of a plant, total production may range from as little as 5000 cu. yd. of material to as much as 50,000 cu. yd., 10,000 cu. yd. representing somewhere near the average. In an average year each plant is at 12 to 14 different locations, generally moving 50 or 60 miles at a time. In extreme cases, however, a plant may be moved as much as 200 miles in shifting from one job to another.

The men work a 55-hr. week during the production season. Most of them live at the job site during the week but return to their homes for the week-ends. The bunkhouses and the cookhouses are supplied and maintained by the company, although the men pay a nominal daily rate to cover the cost of food.

Perhaps all the pertinent things that could be written about the Kraemer operations can be summed up best by the statement that nothing is left to chance. With his plants operating in and out of at least 70 quarry deposits each year, Ed Kraemer has adopted the view that close attention to detail is the rock-bottom price he must pay for survival. Applied, as he has applied it, to every phase of a necessarily complex business, the resulting policy of infinite pains has been made to yield handsome dividends.

A portion of the exceptionally neat parts storage room in the general offices. Here, too, nothing is left to chance.

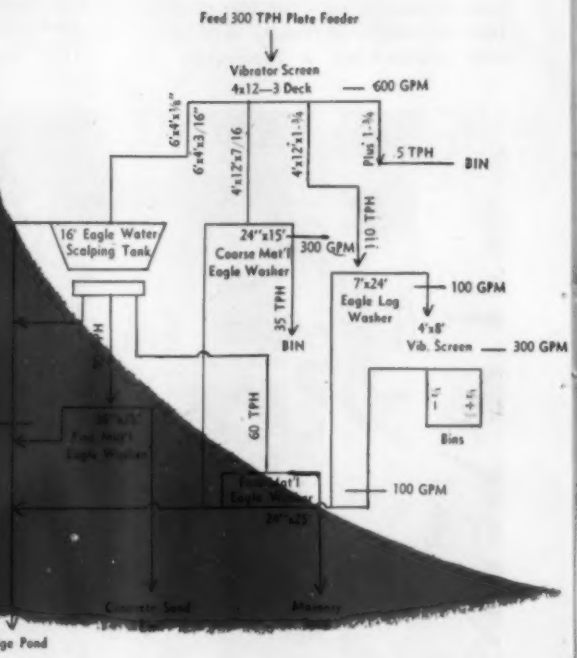
AT HAMLIN SAND & GRAVEL CO., INC., HAMLIN, TEXAS

"PRODUCING THE CLEAN

Eagle 16 Water Scalping Tank removes excess water without loss of fines and presatisfies material. "Spillers" on ... adjustable bleeder valves control the gradation of material delivered to ... particular screw washer.

Pit run material goes in at top. Material ... through processes by gravity to bins . . . maximum economy and efficiency is inbuilt by Eagle engineering.

FLOW DIAGRAM

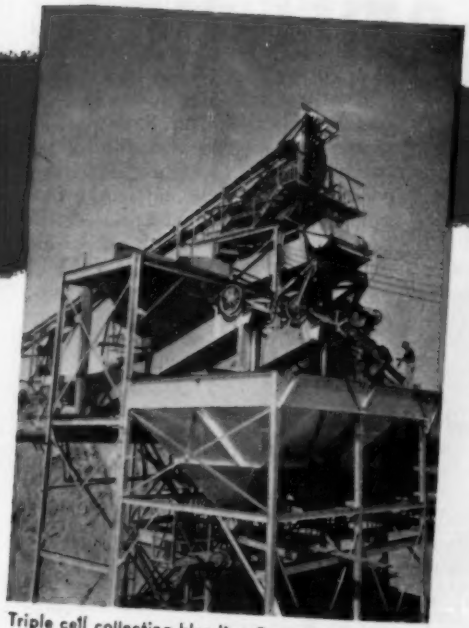


EST MATERIAL IN TEXAS"

WITH AN

EAGLE

complete WASHING AND CLASSIFYING SECTION!



Triple cell collecting-blending flume for making two types of sand, allowing one section for wasting material if a belly is present in the deposit.

Texans seldom settle for less than the best . . . that's why Hamlin Sand & Gravel Co., Inc., installed an Eagle Complete Washing & Classifying Section at their Flattop, Texas, aggregate plant. Their Eagle section consists of an Eagle Log Washer for washing coarse gravel, an Eagle Coarse Material Washer for pea gravel, an Eagle 16' Water Scalping Tank, an Eagle 36" x 25' single screw, long weir, Fine Material Washer to process concrete sand, a 24" x 25' single screw Fine Material Washer to process masonry sand, and Eagle flumes, chutes and steel supporting structure. Output averages 300-TPH of clean material which readily meets specifications. One of the finest, most modern plants in the country.

Hamlin produces well over 300,000 tons annually from their dry pit operation using cut and fill method. Overburden averages 4' to 5'. Deposit is 7' deep. All sizes of gravel produced from pea gravel to 1½". Also concrete sand, mason sand or any blend. Material marketed for roofing gravel, hot mix aggregate, filter media, plaster sand, shooting gravel and concrete aggregate. Shipped by truck and rail. One of many successful Eagle installations in Texas.

Everywhere, Eagle Equipment is giving satisfactory and profitable performance. Eagle has long specialized in the washing and classifying field. Eagle has the "know-how" plus the greatest number of installations to back it up. Get the facts!

Meet J. W. Maddox, President and W. M. Blackburn, Sec'y-Treas., co-owners of Hamlin Sand & Gravel Co., Inc., who state, "We are producing the cleanest material in Texas".

Producers find it easy to work with qualified, factory-trained Eagle distributors. Conley-Lott-Nichols Co., Lubbock, Texas, sold this installation.

EAGLE IRON WORKS 133 Holcomb Ave. Des Moines, Iowa.

WASHINGTON NEWS LETTER

The Housing Boom Continues

CONTRARY to the trend in previous recessions or depressions, the construction and sale of housing continues to show more stability than most other businesses.

As reported recently by the Federal Reserve Board, the facts are these: "For almost three years markets for residential real estate have been characterized generally by high levels of activity and little change in prices. At times during this period, sales have slowed down and prices have appeared to weaken, especially for older properties. For the most part, however, demands for additional housing space have continued large as population has continued to increase rapidly and to change residence frequently, as families have increased in number and size, and as incomes have remained high."

Specific details on the extent of home ownership were also provided by the Federal Reserve Board. In a special survey of consumer finances, it was found that:

1. The proportion of consumers owning their own homes has increased significantly in recent years —from 51 percent in 1950 to about 56 percent in 1953.

2. A large proportion of home owners have lived in their present homes for a relatively short period of time. At the beginning of 1954, more than one-third of all home owners had occupied their homes for less than five years.

3. The average value placed on their homes by owner-occupants in early 1954 was $10,700. This is well above the $8,650 figure established in 1950.

Slightly over half the home owners in 1954 reported having a mortgage on their property, and the average mortgage amounted to about $4,800. Five years earlier about 45 percent of the owner-occupied homes were mortgaged and the average mortgage was approximately $3,900.

Mortgage—Key to the Housing Boom

It is generally conceded that without relatively liberal mortgage terms the housing boom might never have materialized.

Four out of every five of the owner-occupied homes purchased within the last five years are mortgaged. The liberal mortgage terms in recent years, particularly those extended to veterans of World War I, account in part for a relatively large proportion of mortgages equal to 70 percent or more of the value of houses acquired within the last five years.

Despite the fact that mortgage money became very tight in the middle of 1953, new mortgage credit in the amount of $1,970,000,000 was extended during that year. This was substantially more than in any other year.

In the first quarter of 1954 home mortgage debt rose about 1.5 billion dollars. This was slightly less than in the corresponding period last year. Also, the increase in federally underwritten debt has been smaller this year than in corresponding periods of the two preceding years.

Mortgage Money Easing

Because interest rates generally were rising during the period from 1951 to mid-1953, home mortgages, particularly federally underwritten mortgages whose rates were fixed, were less attractive to investors than other types of securities. The higher rates established for FHA and VA mortgages in early May, 1953, the easing in money conditions, and the decline in yields on other investments have encouraged larger institutional investment in these mortgages since late 1953.

In recent months life insurance companies have increased their holdings of VA-guaranteed mortgages sharply. The mortgage holdings of commercial banks have increased moderately.

Savings and loan associations have expanded their mortgage portfolios as much in the first quarter of this year as the first quarter of last year. Mutual savings banks increased their mortgage portfolios more in the first quarter of this year than in the corresponding quarter of almost every post-war year.

As a matter of fact, the market for home mortgages has improved so substantially that the Federal National Mortgage Association (FNMA) raised the price of its VA-guaranteed 4 percent mortgages from 96 to 98 percent of par, and of its FHA insured 4¼ percent mortgages from 97¾ to 99¾.

The Future for Mortgage Money

There is every reason to believe that the housing boom will continue because the government will probably see to it that mortgage money will still be easy to get.

Although the House and Senate passed different versions, which still have to be reconciled, the two houses agree that the Public Housing Act of 1954 should permit larger loans and longer maturities for both new and old houses. They would also permit somewhat larger insured loans on rental-co-operative properties, make mortgage insurance available for rehabilitation of existing dwellings and construction of new units in urban renewal areas, and make particularly easy terms available to families displaced because of urban renewal and other public improvement projects.

The bills also agree on provisions which would increase the maximum home mortgage loan which a federal savings and loan association may make from $20,000 to $35,000 and the maximum unsecured property improvement loan from $1,500 to $2,000.

That home improvements have become a big business is indicated by the fact that $6,500,000,000 were spent on them in 1952 and 1953 and $6,000,000,000 in each of the preceding five years.

If easy credit were a sure guarantee of prosperity, the home building and improvements business would be assured by Washington of good times for years to come.

A.M.A. Publishes Booklet On Truck Transportation

A new booklet, titled *What Do You Know About Trucks?* has been published by the Automobile Manufacturers Association, New Center Bldg., Detroit, Mich. for free distribution.

The three-color, 12-page publication briefly highlights the story of the motor truck's influence on American life. In a light, non-technical style, it covers basic information on truck transportation, such as production, registrations, exports, taxes, employment, and the variety of services that trucks perform.

Quarterly figures were reported as follows by H. P. Buetow, president of Minnesota Mining & Manufacturing Company: net income for the first three months of 1954 was $5,354,866, or 64 cents a share, as compared with $4,354,859, or 53 cents a share in 1953. Sales totalled $54,088,789 in the first quarter of 1954, as against $51,062,122 in 1953.

Making Your Bags is Our Full-Time Job

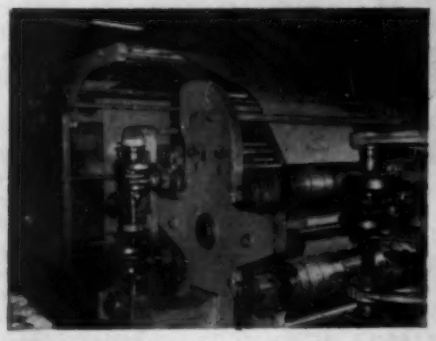
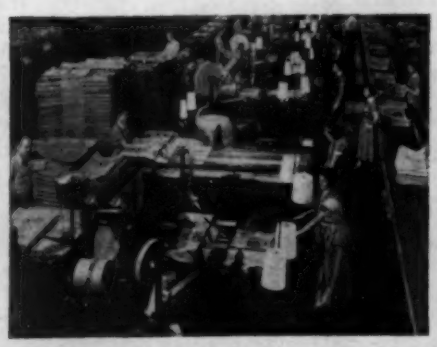


Photo at right shows V-C engravers making printing plates. Well-designed, expertly printed bags have real sales appeal—put your product out front. Photo above shows one of V-C's multi-color printing presses.



A battery of sewing machines staffed by highly-trained operators and inspectors. Modern machinery, skilled operators, and diligent inspectors, mean better-built, longer-lasting V-C Bags for your product.

THE BAG you use to package your product is only one of many items essential to your business success. But to the V-C Bag Division, the manufacture of better bags is a full-time job. That's why it will pay you to discuss your bag problems with a V-C representative. Possibly he can make suggestions that will improve or lower the cost of your packaging. Let him tell you about V-C's expert designing, printing, construction, and speedy service and delivery of V-C Multiwall Bags.

Virginia-Carolina Chemical Corporation

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Men of the Industry

HENRY CROWN—Top Producer of Aggregates

COLONEL Henry Crown, chairman of the board of the Material Service Corporation of Chicago and top-side executive of numerous other well-known undertakings across the country, exemplifies high accomplishment from modest beginnings. Son of a Lithuanian immigrant, Colonel Crown at 23, with his brothers Sol R. and Irving, after World War I, in January, 1919, formed their own building materials supply firm with $10,000 capital. From that humble partnership evolved the sprawling complex that is M.S.C. today—five crushed stone quarries, four sand and gravel plants, a concrete pipe plant, over a dozen ready-mixed-concrete plants and storage yards, fleets of trucks of every description, six modern diesel towboats and 150 barges—all combined into a smooth-running production machine.

His life story is a matter of many records, telling of his various business successes. Many who know Colonel Crown say his success is due mainly to his wisdom, genius, and ability to work out ideas on a gigantic scale with consummate skill. Other intimates claim that his success is based largely on his affability and on his ability to co-operate and to understand the little fellow with whom he works, his family, his problems, and his future. Material evidence of his interest in his associates is reflected in a recent statement by Colonel Crown that the employees of M.S.C. are today benefiting by over 30 percent of their salaries from the profit-sharing plan of the company, initiated nine years ago.

In talking with him recently, we hoped that we might bring to light some heretofore undiscovered facet of his life which might reveal the spark responsible for his success. Perhaps he supplied a clue to this, when he tossed a paper across the desk, remarking that it had been received in the morning's mail. It proved to be a writeup of a recent reunion of a grade school group; upon this occasion he had been chosen the outstanding graduate of The Jonathan Burr School in northwest Chicago for the last 50 years. He said, "I'll admit I do like it! Perhaps because it's the only day school I ever graduated from." (Actually, he finished night courses in public high school and at La Salle Extension University.)

Col. Henry Crown

Colonel Crown has many lines in *Who's Who in America*. Typically, it starts, "—Clerk, Chicago Fire Brick Company, 1910-12." It has not yet ended, as his copy has more pencilled additions to the lists of firms and positions, university trusteeships, military affiliations, clubs and directorships, etc., than the last issue of the book had shown for him.

A year ago he was announced a winner in the annual Horatio Alger award in his field, having been selected by 3,000 campus leaders from 600 colleges and universities from coast to coast. It marks the highest achievements from humble beginnings attained by a dozen American leaders each year. This is only one of several awards which hang in his office.

Material Service Corporation typifies an organization which Colonel Crown has built up, integrated to function within itself from source of materials to final sales. Already the largest building supply firm in the world, with $55,000,000 in sales for the last year, the company has added to its operations in 1954 alone over a million dollars' worth of steel barges—20 of them, each carrying over 1,000 tons of aggregates—bringing these materials to the Chicago yards and processing plants. From these plants, located strategically along the two branches of the Chicago River spanning the city, 175 modern truck mixers serve the ready-mixed concrete industry, each with an average round trip haul of only 3 to 4 miles

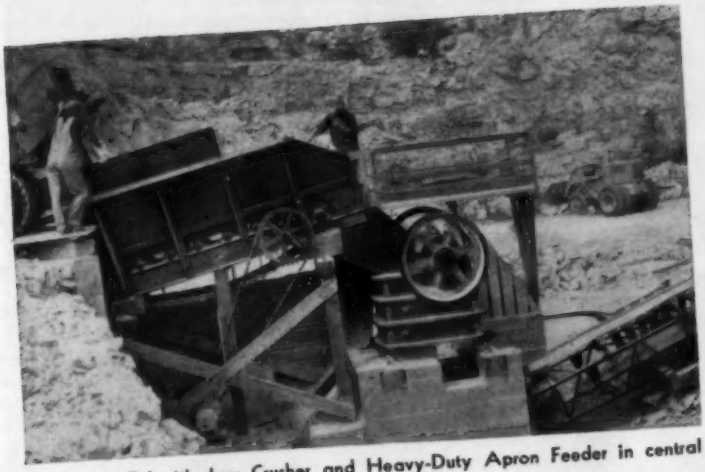
Until four years ago Material Service and other producers were supplying the Chicago building industry with batched dry aggregates direct to the jobs, a method of supply to which the contractors had become accustomed for many years. Only a small amount of ready-mixed concrete was being delivered inside the city by any of the concrete producers, a situation radically different from that which existed in every other city of 25,000 or more population in the country.

It took a bit of diplomacy to convince the local building trades unions that it was necessary to remove certain restrictive practices in order to furnish ready-mixed concrete efficiently to Chicago jobs, but Colonel Crown was equal to the occasion. His was one of the first companies—and from that time on the largest—to supply the city with ready-mixed concrete. Since that time he has constantly improved plants and distributing equipment, from gravel pit to discharge on the job in order to make them function most efficiently. It was not always so, however, as he tells the tale of the time he was fired from his first job for sending a customer two loads of sand instead of one load of sand and one of gravel, apparently his only lapse from efficiency.

While sand, gravel, and stone remain the foundation of his resources, Colonel Crown's later excursions into other fields have met with equal success. He is chairman of the board of the Empire State Building Corporation, owning the world's highest structure; he is also chairman of the board of the Freeman Coal Mining Corporation, operating three Illinois coal mines which produce 22,500 tons daily; he is chairman of the board of the Marblehead Lime Company, which has four large lime plants and one refractory dolomite plant in Illinois and Missouri, three of these strategically serving the Chicago industrial and building industries; he is a director and a member of the executive committee of the

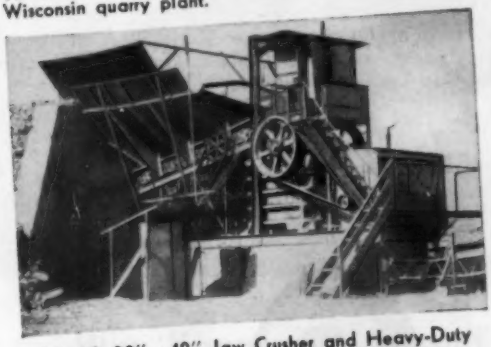
(Continued on page 79)

for BIG capacity



18" x 32" Telsmith Jaw Crusher and Heavy-Duty Apron Feeder in central Wisconsin quarry plant.

Telsmith 10" x 36" Jaw Crusher in an Oregon sand and gravel plant.



Telsmith 30" x 42" Jaw Crusher and Heavy-Duty Apron Feeder build airports in North Africa.

TELSMITH JAW CRUSHERS

25" x 36" Telsmith Jaw does the primary crushing of ore in British Columbia mine.

SEND FOR BULLETIN 280

30" x 42" Telsmith Jaw Crusher and Heavy-Duty Apron Feeder in Pennsylvania quarry.

18" x 32" Telsmith Jaw Crusher, Heavy-Duty Plate Feeder and Rotary Grizzly in New York gravel plant.

J-1

SMITH ENGINEERING WORKS, 504 E. CAPITOL DRIVE, MILWAUKEE 12, WISCONSIN

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Marens Eqpt. Co., New Hudson, Mich. • Rish Eqpt. Co., Cincinnati 14, & Portsmouth, Ohio—Charleston 22, & Clarksburg, W. Va.—Roanoke 7, & Richmond 10, Va. Robert S. Bailey, 816 W. 5th St., Los Angeles 17, Calif. • Mines Eng. & Eqpt. Co., San Francisco 4, Calif. • Clyde Eqpt. Co., Portland 9, Ore., & Seattle 4, Wash.

want high speed plus endurance? How's this...

1000 HOURS at 3600 R.P.M. UNDER FULL LOAD!

If you were to drive 90,000 miles up an incline at 90 m.p.h., you would approximate the performance of the Model 24A, 331 cubic inch displacement Chrysler Industrial Engine pictured below.

To prove the power of Chrysler Industrial V8 Engines . . . their ability to run for long periods of time at high speed . . . on March 17, 1954 Chrysler engineers placed a production model Ind. 24A Engine on an endurance dynamometer at Chrysler Central Engineering Laboratories. Objective: 1000 hours operation at 3600 R.P.M. under full load.

During every one of the 1000 hours, the Chrysler Ind. 24A Engine delivered an average of 174 horsepower and when shut down, the engine was still in perfect operating condition.

During the run no service was necessary beyond minor maintenance care, such as oil changes and very infrequent spark plug changes and point adjustment. Yet, following disassembly of the engine, the only wear noted was negligible—no more than you might expect from an engine that has been operated for 1000 hours within a long period of time.

While there is every reason to believe that this is a record-breaking endurance run (and don't forget it was made at 3600 R.P.M. under full load), we are confident that every Chrysler Industrial V8 Engine will *at least equal* this astounding record.

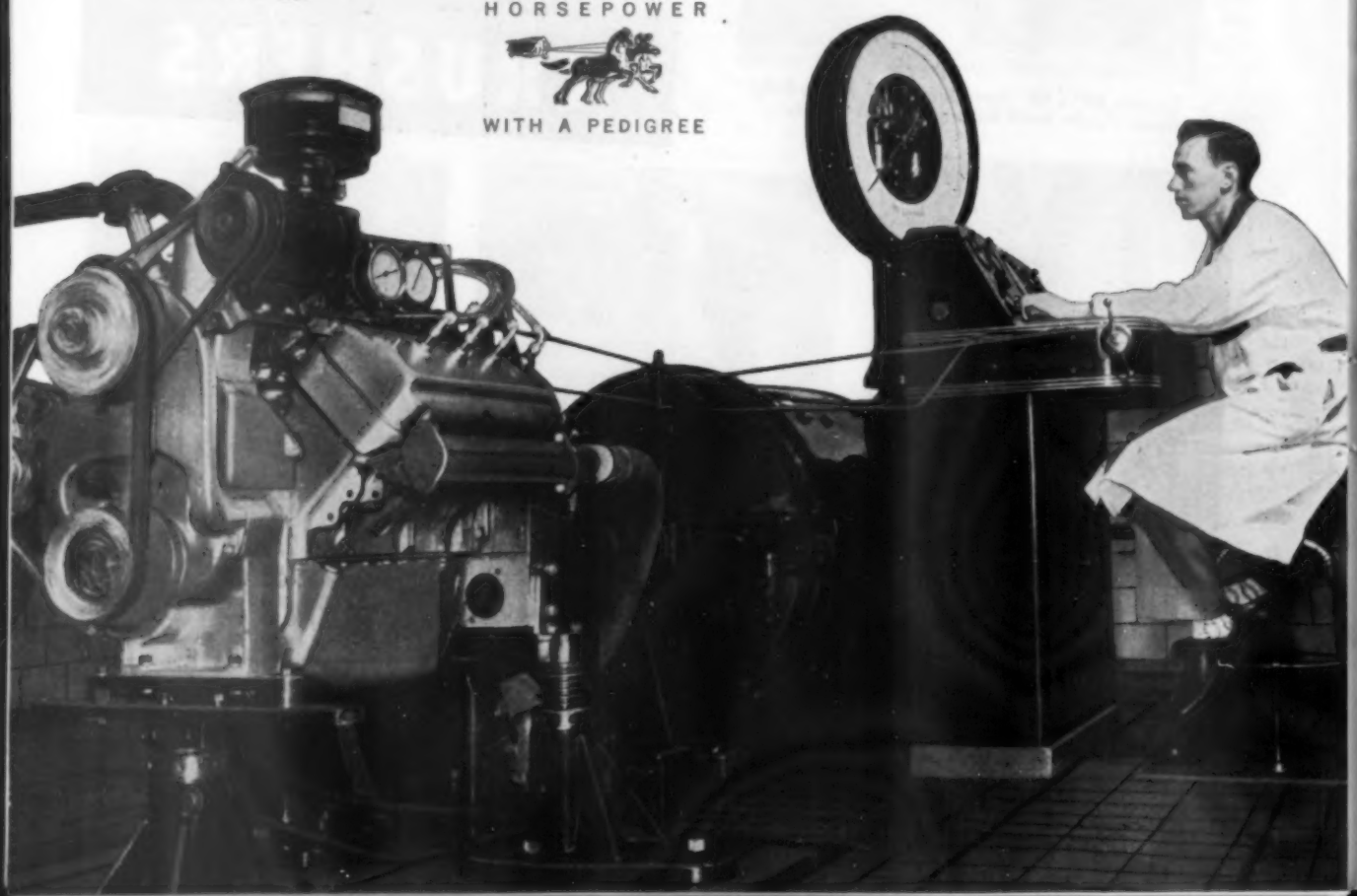
This proves too, beyond a doubt, that the Chrysler Industrial V8 hemispherical combustion chamber design with its short-stroke, low-friction construction, makes an ideal power plant for any equipment that requires continuous high speed operation. Furthermore, in installing a Chrysler V8 Engine in preference to a diesel engine of similar horsepower, you can reduce your size estimate by one-half, your weight by two-thirds, and your cost factor by three-quarters!

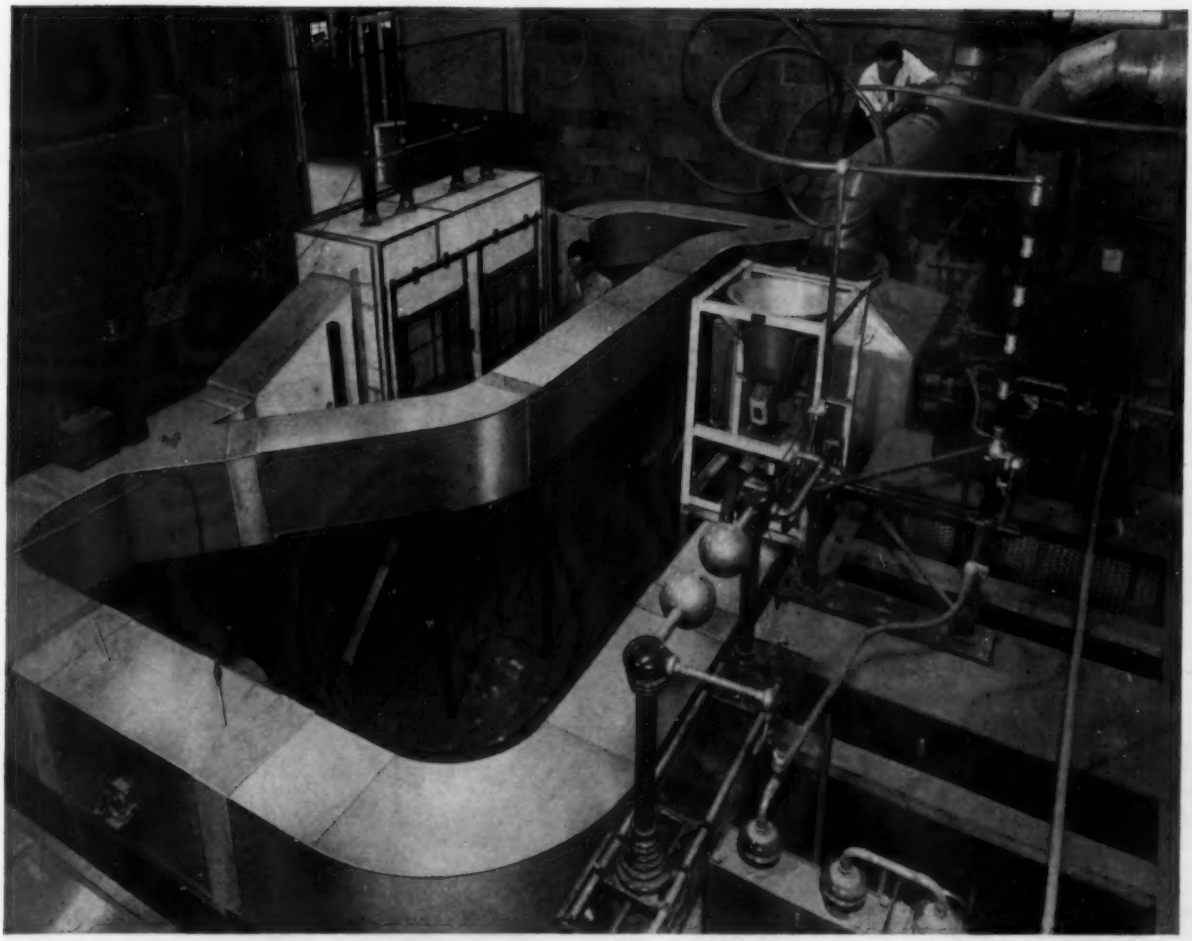
For detailed information on the Model 24A or any other Chrysler Industrial Engine, see a Chrysler Industrial Engine Dealer or write: ***Dept. 138, Industrial Engine Division, Chrysler Corporation, Trenton, Michigan.***

CHRYSLER *Industrial Engines*

INDUSTRIAL ENGINE DIVISION • CHRYSLER CORPORATION

HORSEPOWER WITH A PEDIGREE





Precipitator pilot plant, Verona Research Center of Koppers Company, Inc.

Why Koppers Electrostatic Precipitators work so well

The answer to why Koppers Electrostatic Precipitators work so well is to be found in the sound engineering principles followed, from the project stage right through to actual installation . . . *application engineering "know-how."*

The wealth of experience gained over the years in designing and building equipment for cleaning gases provides the basis for such "know-how." In addition, foreign installation and engineering data is available to Koppers engineers through special agreements . . . Koppers experts are kept up-to-date on new process developments on a world-wide basis.

Koppers also has extensive laboratory facilities to analyze plant processes and problems in industrial gas cleaning. It has pilot equipment and competent personnel to conduct conclusive tests.

It's this knowledge, this experience, these facilities that make for satisfactory service . . . service for which Koppers has long been famous.

Next time you have a gas cleaning problem, remember that every problem is different, every problem contains variables which must be correctly analyzed before a satisfactory solution is reached. So it will pay you to consult Koppers . . . the company with *application engineering "know-how."* Mail this coupon for additional information.

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AMSCO "COUNTER-FLOW"

protects critical areas, increases service life

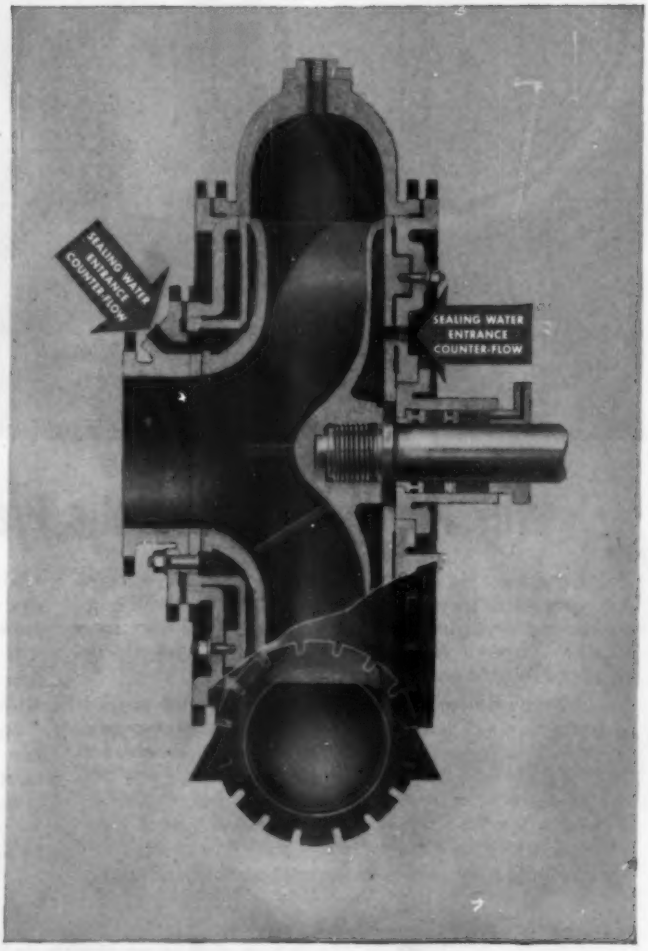
1. Wear-Reducing Impeller Design—In Amsco pumps, the "Counter-Flow" principle embodies a unique impeller design. The impeller is funnel shaped on the entrance side.

A constant flow of clear water, under high pressure (suggested 10 psi in excess of dredge pump discharge pressures), is introduced between the impeller shrouds and side plates to eliminate abrasive-laden water from critical areas, thereby reducing wear. In addition, the sealing water aids in reducing localized wear on some parts of the shell.

2. Less Internal Leakage—The "Counter-Flow" design of pump will give more sustained efficiency because there is less internal leakage on recirculation than in standard pumps.

3. Reduced Resistance to Flow—An important advantage of the funnel-shaped impeller is found in its wide throat passages which reduce resistance to flow and thus substantially reduce power loss.

"Counter-Flow" is now an optional feature on all standard Amsco Dredge Pumps, from 6-inch through 20-inch. For additional information, write to the Amsco Division, Chicago Heights, Illinois.



American Brake Shoe Company

AMERICAN MANGANESE STEEL DIVISION
Chicago Heights, Ill.

A.S.T.M. Holds 57th Annual Meeting—Features Exhibit, Technical Sessions

CHICAGO was the host to a large group of members and visitors attending the 57th annual meeting of the American Society for Testing Materials from June 13 through 18, 1954. The local committees,

By C. E. PROUDLEY
North Carolina State Highway and Public Works Commission

headed by its honorary chairman, H. H. Morgan, president of the Robert W. Hunt Company, and directed actively by Dr. A. Allan Bates, vice-president of Research and Development, Portland Cement Association, as chairman, provided the many comforts and conveniences, and the relaxation enjoyed by this gathering of scientists and engineers.

This was the year for an exhibit of testing and scientific apparatus and laboratory supplies, and a photographic exhibit distinguished by photomicrography and radiography. The 59 exhibitors demonstrated everything from microscopes and spectroscopes to air conditioning and refrigeration units for laboratory purposes. The advances in supplies, laboratory equipment, and apparatus in recent years have kept pace with the electronic age.

The actions of the A.S.T.M. committees may not always be the most spectacular features of the annual meeting but to industry they are generally of great importance.

Committee Reports

Committee C-1 on Cement proposed new Tentative Specifications for portland-pozzolan cement which is the result of several years of study of cements produced by intergrinding portland cement clinker and pozzolan, or an intimate or uniform blend of portland cement and not less than 15 percent nor more than 50 percent by weight of the fine pozzolan. The proposed new cement will be identified as type IP and type IP-A. The portland cement constituent will conform to the chemical requirements of Type I or Type II.

The Committee on Cement also proposed a Tentative Method of Test for Heat of Hydration of Portland Cement (Short Method), A.S.T.M. Designation C 186-T. This method of test, according to the stated scope, is intended to provide

Dr. A. Allan Bates, vice-president, research and development, Portland Cement Association, directed the work of the local convention committees.

a short, convenient procedure for the determination of the heat of hydration of portland cement but it is intended that, in case of dispute, results obtained in accordance with the Standard Method of Test for Heat of Hydration of Portland Cement, A.S.T.M. Designation C 186-53, shall govern. It is the intention of the committee to make this proposed tentative method an addition, when adopted, to the present standard method of test for heat of hydration of portland cement.

During the year the Tentative Specifications for Natural Cement, A.S.T.M. Designation C 10-52T, were recommended for adoption as standard to replace the current Standard Specification for Natural Cement (C 10-37) which is now being recommended for withdrawal.

In the work of the subcommittees of Committee C-1, the effect of mechanical mixing on standard mortars is being investigated extensively. The performance of mortars when tested by a proposed method of test for flexural strength of mortar bars and for compressive strength of the resulting portions of the bars when tested as "modified" cubes is being studied. Studies of the Tentative Test for Bleeding of Cement Pastes and Mortars are being conducted by a number of laboratories, and 13 laboratories are co-operating in an organized investigation of the sulphate resistance of cements. One new subcommittee has been studying the properties of slag cement, and another subcommittee is beginning work on the so-called "false set" of cements.

The committees of the society hold elections in the even-numbered years, and Committee C-1 continued the incumbent officers for another two years, with R. R. Litehiser as chairman, W. C. Hanna as vice-chairman, W. S. Weaver as secretary, and J. R. Dwyer as technical assistant.

The activities of Committees C-9 on Concrete and Concrete Aggregates and Committee D-4 on Road and Paving Materials are always of special interest to operators of pits and quarries. Committee C-9 under the chairmanship of L. W. Teller, principal highway engineer, Bureau of Public Roads, proposed a new Tentative Method of Test for Volume Change of Concrete Products which is intended to provide a routine standardized procedure for use on such products as masonry units, concrete pipe, cast stone, prisms, or sawed sections representing these products. Another tentative method of test was proposed for Potential Volume Change of Cement-Aggregate Combinations. This test measures the linear expansion developed by the combinations in mortar bars subjected to variations of temperature and water saturation during storage under prescribed conditions of test. The method is regarded, according to the scope stated in the proposed method, as having particular applicability to certain cement-aggregate combinations common in the central part of the United States (Oklahoma, Kansas, Nebraska, and Iowa).

Lightweight Aggregate Specifications

Committee C-9 is recommending that the standard specification for lightweight aggregates for concrete (C 130-42) be withdrawn and replaced by Specifications C 330-53T, "Lightweight Aggregates for Structural Concrete" and C 331-53T, "Lightweight Aggregates for Concrete Masonry Units." These recommendations were accepted by the Administrative Committee on Standards on December 16, 1953, and already appear in the 1953 *Supple-*

W. C. Hanna, vice-chairman, Committee C1 on Cement.

ment to Book of A.S.T.M. Standards —Part 3.

The Subcommittee on Aggregate Mineral Characteristics as Related to Concrete of Committee C-9 has recommended a considerable number of revisions in C 294-52T pertaining to descriptive nomenclature of constituents of natural mineral aggregates. Among the more interesting of the recommendations are those which pertain to carbonate rocks. To quote from the proposed revision:

"Carbonate rocks containing 10 to 50 percent sand are arenaceous (or sandy) limestones (or dolomites); those containing 10 to 50 percent clay are argillaceous (or clayey or shaly) limestone (or dolomites). Marl is a clayey limestone which is fine-grained and commonly soft. Very soft carbonate rocks are known as chalk or 'lime rock'. Limestone recrystallized by metamorphism is known as marble.

"Note that 'magnesium limestone' is sometimes applied to dolomitic limestones and calcitic dolomites but it is ambiguous, and its use should be avoided. The term 'lime rock' also is not recommended."

The often misunderstood term "graywacke" is thus defined: "Sandstone containing abundant dark particles of rocks, such as chert, slate, phyllite, and schists, in addition to mineral grains in a matrix resembling shale or slate."

It is interesting to note that Committee C-9 recommends Tentative Revisions of the Standard Definitions of Terms Relating to Concrete and Concrete Aggregates (C 125-48) as follows:

"Bleeding—The autogenous flow of mixing water within, or its emergence from, freshly placed concrete or mortar.

"Workability of Concrete—That property determining the effort required to manipulate a freshly mixed quantity of concrete with minimum loss of homogeneity."

And as a substitute for the definition of "aggregate" now appearing in C 58-28T, the subcommittee on editorial and definitions recommends:

"Aggregate—An assemblage of naturally-occurring, processed or manufactured, inorganic particles or grains in prescribed graduation or size range and forming concrete, mortar, mastic, or plaster if bound by a cementing material."

Editorial revision was made by the addition of the same note in both C 192-52T "Making and Curing Concrete Compression and Flexure Test Specimens in the Laboratory" and C 31-49 "Method of Making and Curing Concrete Compression and Flexure Test Specimens in the Field." The note pertains to capping materials and is as follows:

"Note — Low-strength molding plasters are unsatisfactory for use in capping strength specimens. Special high-strength plasters only have been found satisfactory. The following two plasters are considered (to be) in this classification: 'Hydrostone' and 'Hydrocal White'."

The tentative method C 192-52T has been recommended for advancement to standard, as were a number of other test methods, among them a "Test for Comparing Concretes on the Basis of the Bond Developed with Reinforcing Steel" (C 234-49T) and "Test for Soft Particles in Coarse Aggregates" C 235-49T.

Norman L. Mochel, manager, metallurgical engineering, Westinghouse Electric Corp., who served as the society's vice-president for the last two years, was elected president at the recent A.S.T.M. annual meeting.

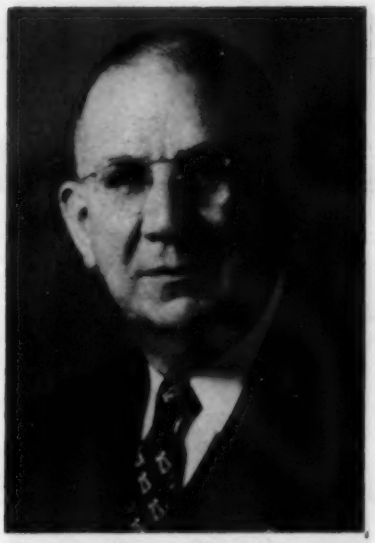
Rudolph A. Schatzel, vice-president and director of engineering, Rome Cable Corporation, Rome, N.Y., who has been active on several A.S.T.M. committees and subcommittees, was named vice-president of the association for a two-year term.

Committee on Road and Paving Materials 50 Years Old

Committee D-4 observed its 50th anniversary at a meeting held in Washington, D. C., on February 5, 1954. The original Committee H on Standard Tests for Road Materials redesignated Committee D-4 on May 1, 1910, held its first meeting for the purpose of organization on February 8, 1904. The celebration was marked by appropriate recognition of A. W. Dow, consulting engineer, the only living charter member, and a number of other current members who have been associated with the committee's work for 30 years or longer.

Revision of Standard Specifications for Standard Sizes of Coarse Aggregate for Highway Construction (D 448-49) was requested for immediate adoption by the society to change size number 3, 2-in. sieve, in Table 1 from "95 to 100" to "90 to 100". This revision calls for similar revisions in the following: Tentative Specifications for Hot Mixed, Hot Laid Asphaltic Concrete for Base and Surface Courses (D 947-52T); Standard Specifications for Crushed Stone and Crushed Slag for Bituminous Macadam Base and Surface Courses of Pavement (D 693-49); and Standard Specifications for Crushed Stone, Crushed Slag and Gravel for Water-Bound Macadam Base and Surface Courses of Pavements (D 694-49).

John M. Campbell, administrative director, Research Laboratories Division, General Motors Corporation, another director elected for three years, has long been associated with the society and served on various committees for several years.



Edward J. Albert, president and treasurer, Thwing-Albert Instrument Company, Philadelphia, also a long-time member, who has served on various committees and as vice-chairman of the Philadelphia District Council, was elected to the board of directors for a three-year term.

Douglas E. Parsons, chief, Building Technology Division, National Bureau of Standards, is also a newly-elected board member. He has been affiliated with A.S.T.M. for 30 years and in 1952 received the society's Award of Merit for outstanding service over many years.

The last mentioned standard specification is being tentatively revised by the addition of a new Section 5 (with renumbering of succeeding sections) to allow for the addition of a section on soundness as follows:

"5. *Soundness*—Coarse aggregate, when subjected to five cycles of the soundness test, shall have a weighted loss of not more than 20 percent when sodium sulphate is used or 30 percent when magnesium sulphate is used." The necessary reference to the soundness test method (C 88-46-T) is to be provided for.

Committee D-4 joined with Committee C-9 in recommending the advancement of the Tentative Method of Test for Soft Particles in Coarse Aggregates (C 235-49T) to standard.

The sub-committee sponsoring this test has considered several other important properties of aggregates for which there are no standard methods of test, such as the structural strength of coarse aggregate particles, void content of sands, characteristic shape of sand particles, and resistance of fine aggregate to abrasion. The effect of properties of mineral aggregates upon skid resistance of pavements and the evaluation of deleterious substances in concrete aggregates forms a part of the subcommittee's considerations.

A subcommittee on bituminous surface treatments has proposed specifications for aggregates suitable for use in multiple surface treatments and also a recommended practice for the use of materials in bituminous surface treatments.

The new officers who were installed at the close of the meeting of Committee D-4 are as follows: Charles W. Allen, research engineer, Ohio State Department of Highways, Columbus, Ohio, chairman; Kenneth B. Woods, professor of highway engineering and associate director, Joint Highway Research Project, Purdue University, Lafayette, Ind., first vice-chairman; Fred Hubbard, consulting engineer, The Standard Slag Company, Youngstown, Ohio, second vice-chairman; J. O. Izatt, The Shell Oil Company, New York, third vice-chairman; and John M. Griffith, engineer of research, The Asphalt Institute, New York, secretary.

Gypsum Concrete

The scope of Committee C-11 on Gypsum is to be revised by adding the last five words in the following description: "The formulation of specifications, methods of test, and definitions relating to gypsum, calcined gypsum, gypsum products, *and aggregates for use therewith.*"

A new tentative specification accepted by the Administrative Committee on Standards and designated as C 317-53T, entitled "Tentative Specifications for Gypsum Concrete", may be misleading to some. Subsequent to this action Committee C-11 recommended deletion of any reference to the use of mineral aggregate designated as Type II. The scope of the proposed revised tentative specification for gypsum concrete states: "1. These specifications cover mill-mixed gypsum concrete, consisting essentially of calcined gypsum and suitable aggregate, requiring the addition of only water at the job. Gypsum concrete is intended for use in the construction of poured-in-place roof decks or slabs. Two classes, based on the compressive strength and density, are covered."

Request for immediate adoption of revision of Standard Specifications for Gypsum Wallboard (C 36-52) was made to add to section 2, a sentence: "The back surface of insulating gypsum wallboard shall in addition be covered with aluminum foil." Practically the same change was made in Section 2 of the Standard Specification for Gypsum Lath (C 37-50).

Standard Methods of Testing Gypsum and Gypsum Products (C 26-52) is proposed for revision by adding a paragraph and new figure descriptive of a consistometer. The consistometer will be used for determining the consistency of gypsum plaster and gypsum concrete.

With reference to fire tests of materials and constructions, it should be noted that a special task group of Committee E-5, chairman, Arthur L. Brown, chief engineer and assistant manager, Associated Factory Mutual Fire Insurance Companies, has prepared a draft of a fire test method using small-size specimens upon the suggestion of A.S.T.M. Committee E-6 on Methods of Testing Building Construction and proposes to include the method as an appendix to Standard Methods E-119.

Sampling

Several of the general sessions were of direct interest to those concerned with construction materials. However, one of the sessions was devoted to a symposium on coal sampling which, although not a construction material, is subject to some of the same problems of inspection which apply to mineral aggregates. The tests performed on the samples are, of course, entirely different except for certain gradation requirements, but the matter of selecting representative samples during the processing of the raw product are identical. Mechanical methods for sampling coal were described by A. O. Blatter, Union Electric Company of Missouri in a discussion of A *Test on a Slotted Revolving Cylinder Coal Sampler*. In another paper on *Tests of Accuracy of a Mechanical Coal Sampler* R. L. Coryell, F. J. Shwerd, and E. J. Parente, Consolidated Edison Company of New York, approached the problem with a somewhat different device and analytical methods. The analysis of statistics pertaining to coal sampling was further discussed by W. W. Anderson, Commercial Testing and Engineering Company, and M. L. Southerland, statistical accountant, under the title *The Variances of Reduction and Analysis*.

In a paper by W. M. Berthold of the Colorado Fuel and Iron Corporation, New York, entitled *Tests of the Geary-Jennings Sampler at Cabin Creek* it was pointed out that A.S.T.M. requirements covering the sampling of coal were intended to be used for "hand" sampling and do not cover the cases in which samples approximating 100-lb. increments are taken. The question of using the same number of increments of large sizes as is prescribed for the small (2- to 10-lb.) increments collected by hand was raised by one of the authors in 1949 through correspondence with A.S.T.M. Committee D-5 on Coal and Coke. The work which was begun on this problem several years ago is being carried on by Subcommittee XIII on Coal Sampling under the chairmanship of W. M. Berthold. Although the discussion of the tests is somewhat more mathematical than it is customary to apply to mineral aggregates, it would be well if those responsible for the control of gradation and other characteristics of mineral aggregates would follow the lead of the Committee on Coal and Coke in order to secure a better understanding of the significance of variations among tests of samples of mineral aggregates.

Dr. Albert T. Goldbeck, engineering director, National Crushed Stone Association, winner of the first Richart Award.

Portland Cement Concrete

At one of the sessions on the significance of tests of concrete presided over by L. E. Gregg, associate research engineer, *Highway Materials Research Laboratory, Kentucky State Highway Department*, Dr. R. O. Mielenz, head, Petrographic Laboratory, U. S. Bureau of Reclamation, Denver, summarized his paper on *Petrographic Examination of Concrete Aggregates* by pointing out that the principal use of a petrographic analysis is to correlate aggregates of known quality with those which are not known. He cited instances where the usual standard tests proved unsatisfactory as indicators of quality where petrographic examination would have indicated the presence of deleterious particles. Although it is customary to think of petrographic examinations as being a laboratory procedure, Dr. Mielenz pointed out that much of the petrographic analytical procedure can be readily conducted in the field.

Bulk Impregnated Specific Gravity

A paper of more importance than might be realized from its title was prepared by W. C. Ricketts, John C. Sprague, D. D. Tabb, and J. L. McRae, all of the Corps of Engineers, U. S. Army. The subject, *An Evaluation of the Specific Gravity of Aggregate for Use in Bituminous Mixtures*, leads to a discussion of the variable absorption of bitumen by aggregates permitting no single one of the conventional specific gravities to be satisfactorily used for porous aggregates in bituminous mixtures. It is indicated that the proper specific gravity to use ranges from conventional bulk to conventional apparent, its relative numerical value depending upon the quantity and type of pores and other characteristics of the aggregate that control the extent to which it is penetrated by bitumen. An erroneous aggregate specific gravity can cause a bituminous mix to be too lean or too rich, with attendant unsatisfactory characteristics. This paper describes what is termed bulk impregnated specific gravity which is a function of, and is concomitantly proportional to, the ratio of bitumen to water absorption of an aggregate. This new specific gravity is an outgrowth of development of the Corps of Engineers' procedures for the design and control of bituminous paving mixtures and has been found satisfactory for general use with aggregates used in this connection.

A definition or description of the term "bulk impregnated specific gravity" is somewhat more complex than should be described here. However, the authors concluded that within the limits of tests performed upon the materials involved in their investigation

"1. No single conventional specific gravity is satisfactory for general use with all porous aggregates used in bituminous mixtures.

"2. Bulk impregnated specific gravity is a function of the ratio of bitumen to water absorption, which varies widely but which follows a definite pattern with different types of aggregate.

"3. All of the forms of specific gravity discussed produce substantially the same end result with aggregate of low porosity.

"4. Bulk impregnated specific gravity is suitable for general use with all aggregates used in bituminous mixtures and is particularly suited for use with porous aggregates."

Honors and Awards

Awards of merit are given annually to individuals who have rendered distinguished service to the society, especially along technical lines. This year the awards were given to Harvey A. Anderson, materials development engineer, Western Electric Company; Benjamin A. Anderton, consultant on tars, oils and pitches, Research and Development Department, Barrett Division of Allied Chemical & Dye Corporation; James Aston, consulting metallurgist, A. M. Byers Company, Pittsburgh; Robert F. Field, retired research and development engineer, General Radio Company; Oliver M. Hayden, manager of technical section, Rubber

(Continued on page 80)

WELLMAN

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TO further round out its line of heavy duty materials handling equipment, Wellman Engineering has purchased the Locomotive Crane Division of The Browning Crane & Shovel Company, Cleveland, Ohio. Modern diesel-powered Browning Locomotive Cranes . . . world-famous for their rugged design and speedy, efficient performance . . . join the long list of WELLMAN products for steel, shipping, transportation, utilities, construction and materials handling fields . . . all backed by 58 years of WELLMAN service to Industry.

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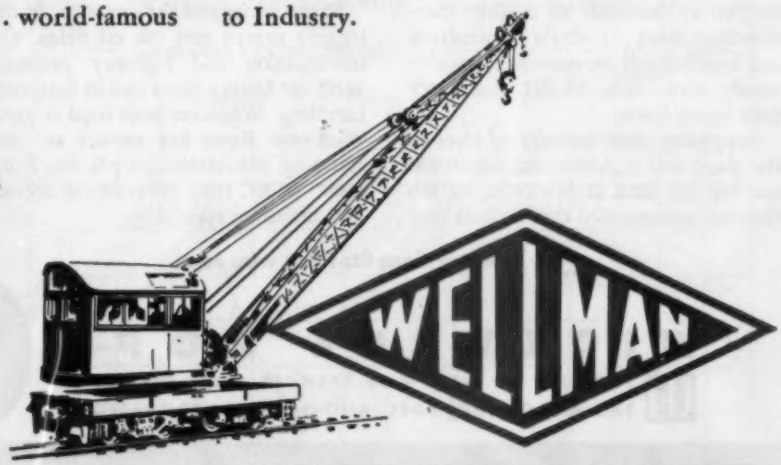
SOAKING PIT COVER CARRIAGES
GAS PRODUCERS
MINE HOISTS
SKIP HOISTS
CLAMSHELL, DRAGLINE BUCKETS
POWER CYLINDERS
and now—
LOCOMOTIVE CRANES



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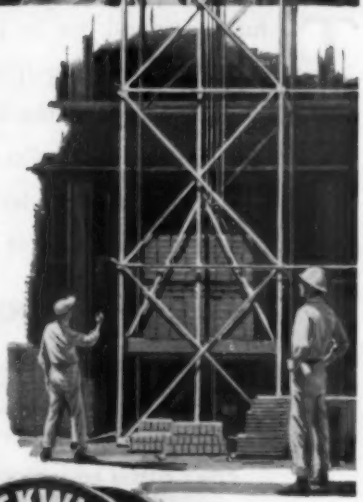

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1954 Cement Demand to Set New Record

Shipments can be determined with reasonable accuracy from new construction estimates

By NATHAN H. SCHEIN
Building Materials & Construction Division
Business & Defense Services Administration
U. S. Department of Commerce

CEMENT consumption in 1954 should break the all-time record set in 1953, since an analysis of cement demand indicates that shipments this year should total about 268 million bbl. This 1954 estimate of cement demand compares with shipments of almost 261 million last year, representing an increase of 7 million bbl., and is based on an estimated $36 billion total of new construction to be put in place in 1954.

The analysis of cement demand further indicates that some 6 million bbl. of cement will be consumed in new residential buildings; some 96 million bbl. in new non-residential buildings; and about 163 million bbl. in new non-building construction (highways, airfields, military construction, farm construction, conservation). Other uses, including nonconstruction, will account for about 3 million bbl. These demand estimates include portland cement both as cement and as concrete products --concrete masonry, precast and prestressed products, ready-mixed concrete, and other products.

Cement producers, in common with all other manufacturers, face the problem of constantly appraising market demand, both as regards present and future needs, and of bringing about necessary adjustments in production schedules, sales quotas, and other activities within the control of the individual business.

In order to appraise market demands, it is necessary to relate the individual company to the total business picture. Many companies have long-established methods for relating their sales to general economic factors affecting them—and conversely, for translating the implications of over-all business trends into their own operations. In most cases, the firm compares the course of its sales or production with changes in certain business indexes which gauge the various broad economic factors most obviously influencing such sales.

Portland cement is a product which is used to produce other goods, one of the so-called "producers' durable goods"; so the comparison of the firm's sales must obviously be made with the part of the economy in which cement is used, namely, construction. Since, unlike some other important building materials, virtually all of the demand for portland cement comes from construction, it is possible to estimate its future demand (particularly the short-term demand, *i.e.*, one or two years) by relating cement shipments to construction activity.

Obviously, construction is not an entity but rather a composite of several differing types of activity insofar as the use of any given building material is concerned. Residential building is quite different, in material consumption, from industrial, commercial, or institutional building. Building construction of any kind is very different from non-building activity—highways, airfields, dams, sewer and water works, etc.

For estimating purposes, therefore, it is necessary to relate cement consumption to significant major types of construction since aggregate demand is the sum of demands represented by the several construction activity components. While it is theoretically possible to relate cement consumption to a detailed breakdown of types of construction, earlier studies indicate that no significant increase in accuracy is thereby attained. For practical estimating needs, it is sufficient to relate cement shipments to three major groups: new residential building activity, new nonresidential building activity, and all other new construction activity.

Accordingly, an estimating equation has been derived based on the three most important demand factors: (1) new residential building activity, (2) new nonresidential work put in place, and (3) all other new construction activity, with the results shown in the accompanying chart. In deriving the "calculated" data, construction activity was measured in dollars of constant purchasing power (1947-49 prices). By means of this equation, it is possible, with a considerable degree of accuracy, to "predict" or estimate cement shipments for the coming year, since annual estimates are made of the outlook for new construction activity. (See Chart 1.)

In November of each year the Department of Commerce and the Department of Labor prepare jointly an Outlook for Construction for the following year. (These estimates are revised in June of the current year for which the outlook is prepared.) Shortly after the issuance of the first report, it is possible to secure a "translation" of the outlook in terms of 1947-1949 prices. With this infor-

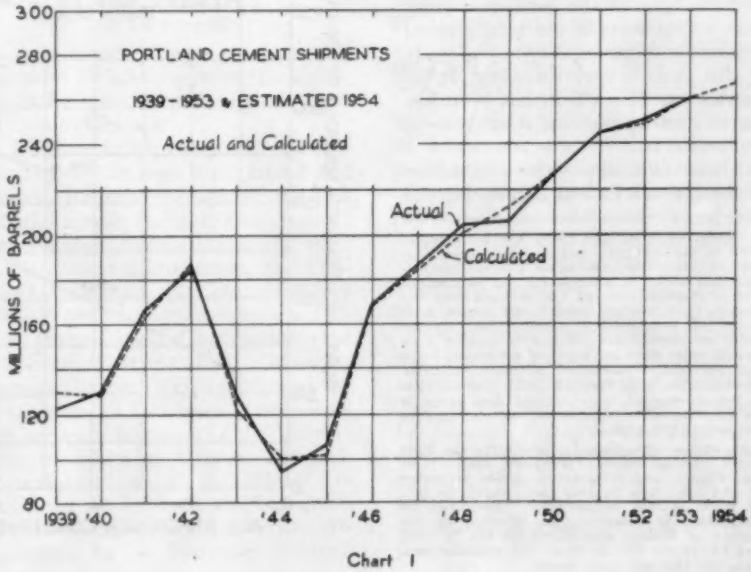

Chart 1

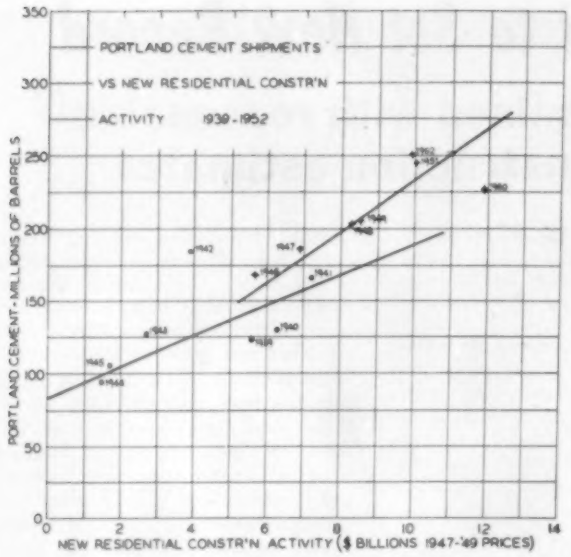
PORTLAND CEMENT SHIPMENTS
VS NEW RESIDENTIAL CONSTR'N
ACTIVITY 1939-1952
PORTLAND CEMENT - MILLIONS OF BARRELS
NEW RESIDENTIAL CONSTR'N ACTIVITY ($ BILLIONS 1947-'49 PRICES)

Chart 2

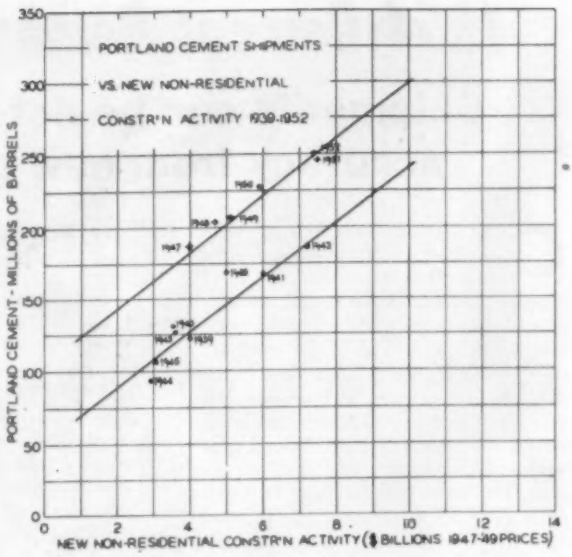
PORTLAND CEMENT SHIPMENTS
VS. NEW NON-RESIDENTIAL
CONSTR'N ACTIVITY 1939-1952
PORTLAND CEMENT - MILLIONS OF BARRELS
NEW NON-RESIDENTIAL CONSTR'N ACTIVITY ($ BILLIONS 1947-'49 PRICES)

Chart 3

mation on hand, it is possible to arrive quickly at an estimate of total industry cement shipments for the coming year.

The foregoing serves to illustrate the proposition that, in general, any particular firm's sales are dependent to a considerable degree on the course of broad external forces; and these can be measured by the basic over-all indicators of economic activity—in the case of cement, new construction activity.

The next step in this process of interpreting a particular firm's position in relation to the course of business conditions is for the individual company to relate its activity to that of its industry.* There are several ways in which this can be done.

It can be done very simply by plotting the ratio of the individual company's shipments to the total cement industry's shipments. Often a study of this ratio is very revealing. It indicates whether a firm has been losing or gaining position relative to its competitors.

These two steps—the evaluation of the over-all factors influencing the shipments of a particular cement firm, and the appraisal of its position relative to the cement industry as a whole—should provide the factual basis for making decisions with respect to the prospects for the individual cement company's markets.

Technical Notes

The relationships between cement shipments on the one hand, and new residential construction, nonresidential construction, and all other construction, on the other hand, follow two distinct patterns: one in the years preceding and including the war period and another in the years after the war. (See Charts 2, 3, and 4.) This suggests that during the war years, when construction was held down and cement use was correspondingly low, new techniques and improvements in use were being

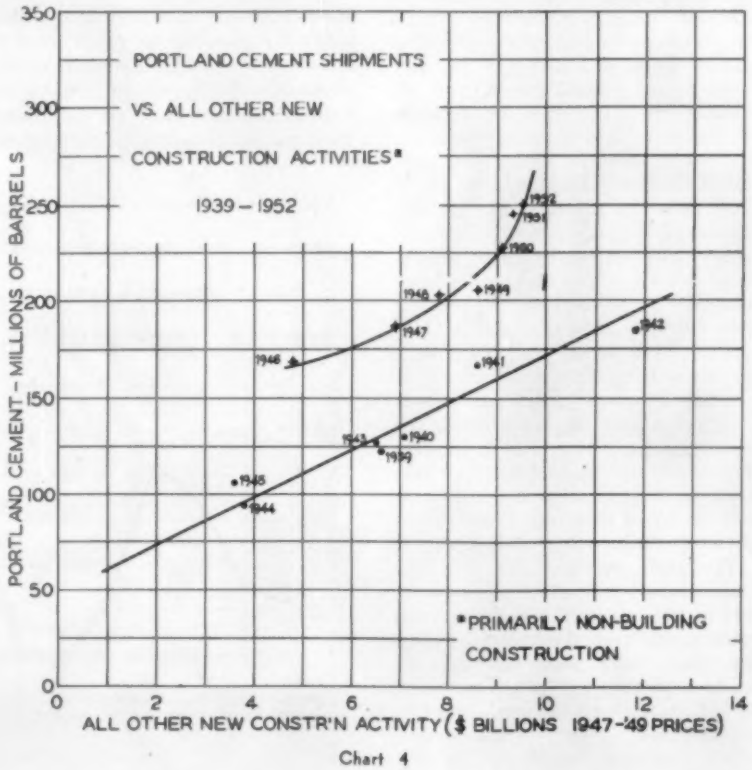
PORTLAND CEMENT SHIPMENTS
VS. ALL OTHER NEW
CONSTRUCTION ACTIVITIES*
1939 – 1952
PORTLAND CEMENT - MILLIONS OF BARRELS
*PRIMARILY NON-BUILDING CONSTRUCTION
ALL OTHER NEW CONSTR'N ACTIVITY ($ BILLIONS 1947-'49 PRICES)

Chart 4

* Since many cement firms are more interested in regional than national estimates, it is well to note that the same general method described above is suitable for the determination of regional demand (or perhaps even the demand in individual states). Of course, estimates of construction activity for specific states or regions are subject to greater estimating error than are national estimates. State and regional construction activity estimates are available only through 1952. In addition to the absence of more current data there is the problem of conversion of regional data to a constant price basis.

An earlier unpublished analysis for the East North Central States (Michigan, Ohio, Indiana, Illinois, and Wisconsin) yielded estimates of 49,675,000 bbl. in 1952, and 53,172,000 bbl. in 1953. Actual consumption (measured by destination of shipments as reported by the Bureau of Mines) was 49,483,000 bbl. in 1952 and 53,136,000 bbl. in 1953. No regional estimate for 1954 has been made.

developed. These new and improved uses apparently came into full fruition after the close of World War II, when construction was freed from wartime restrictions.

This apparent shift over time suggests that in the long-term analysis of cement demand two discrete periods are involved, each of which was subject to different influences. In the case of residential and nonresidential building, the relationships between cement and construction are linear in both periods although the slopes of the lines of relationship are different. In the case of the "All Other" new construction the change from 1939-1945 to 1946-1952 is much more pronounced.

The gross regression of cement shipments on all other new construction indicates a fundamental change in the demand function from 1939-1945 to 1946-1952. In the earlier period the relationship between the two is linear, as it is with residential and nonresidential building. In the latter period, however, the relationship for the "All Other" category is changed to a non-linear one. The nature of the gross regression suggests a logarithmic function as the most appropriate, and this has been used.

Since the demand for cement is created by construction activity of various types, the general demand equation for both periods (1939-1945, and 1946-1952) can be expressed thus:

$x_1 = b_2x_2 + b_3x_3 + b_4x_4$ where

x_1 = estimated consumption (shipments) of cement in millions of barrels

x_2 = new residential construction activity in billions of dollars, 1947-1949 prices

x_3 = new nonresidential construction activity in billions of dollars, 1947-1949 prices

x_4 = all other new construction activity in billions of dollars, 1947-1949 prices.

Construction activity in constant prices is used so that the analysis is in comparable physical quantities. The estimating equations are derived by the least squares method, using the Doolittle method for the solution of the normal equations.

For the period from 1939 through 1945 the estimating equation derived is:

$$x_1 = 49.03058 + 1.34068\ x_2 + 10.92365\ x_3 + 4.60529\ x_4$$

The standard error of estimate after adjustment for 3 degrees of freedom is ± 7.55 million bbl. The maximum variation for the period 1939-1945 is 6.4 percent in 1939. The coefficient of multiple correlation is .936 with 96.7 percent of the variation in cement shipments explained by new residential, nonresidential, and all other new construction activity.

For the period from 1946-1952, the derived equation is:

$$x_1 = 2{,}69190 + .53720\ x_2 + 11.18254\ x_3 + 159.04123 \log x_4$$

The standard error of estimate after adjustment for 3 degrees is ± 4.0 million bbl. The coefficient of multiple correlation is .997 with 99.5 percent of the variation in cement shipments during this period explained by variations in construction activity. Maximum variation during this period was 3 percent in 1949.

This analysis was carried only through 1952, since it was thought desirable to compare actual 1953 shipments with the 1953 estimate based on the derived equation.

New Construction Activity ($ Billions, 1947-49 Prices)

	Portland Cement Shipments (Millions of Barrels)	Total New Construction Activity	New Residential Construction Activity	New Nonresidential Construction Activity	All Others New Construction Activity
1939	122.7	16.2	5.6	4.0	6.6
1940	130.3	16.9	6.3	3.5	7.1
1941	167.4	21.8	7.2	6.0	8.6
1942	185.3	22.9	3.9	7.2	11.8
1943	127.6	12.8	2.7	3.6	6.5
1944	94.3	8.2	1.5	2.9	3.8
1945	106.4	8.4	1.7	3.1	3.6
1946	169.3	15.5	5.7	5.0	4.8
1947	187.4	17.8	6.9	4.0	6.9
1948	204.3	20.8	8.3	4.7	7.8
1949	206.1	22.2	8.5	5.1	8.6
1950	227.8	26.9	11.9	5.9	9.1
1951	246.1	26.8	10.0	7.5	9.3
1952	251.4	27.3	9.9	7.4	10.0
1953	260.9	28.9	10.3	8.2	10.4
1954	267.2†	29.7*	10.4*	8.6*	10.7*

*Revised 1954 outlook in 1947-1949 prices
†Calculated from equation developed in text

Department of Commerce-Department of Labor estimates of construction activity (in 1947-1949 prices) for the years from 1939-1953 plus the outlook for 1954 are shown in the accompanying table. Substituting the 1953 values in the later period equation in the preceding section, 1953 cement shipments are estimated at 261.7 ± 4.0 million bbl. Shipments in 1953, as reported by the Bureau of Mines, totaled 260.9 million bbl. Thus the variation in 1953 was 0.3 percent.

Applying the estimating equation to 1954, it is calculated that, on the basis of the revised 1954 outlook for construction activity in the United States, cement shipments (or consumption) will total 267.7 million bbl. in 1954.

The data on which the foregoing analysis was prepared are presented in the accompanying table.

Men of the Industry

(*From page* 66)

Hilton Hotels Corporation, which operates 17 hotels around the world, including the largest, the Conrad Hilton in Chicago.

His directorships are numerous, including the Chicago Rock Island and Pacific Railroad Company, the 208 South LaSalle Building Corporation, the Waldorf Astoria Hotel, the West Indies Sugar Corporation, the Chicago Association of Commerce, the City Products Corporation, the Hilton International Corporation, the Omnibus Corporation, Madison Square Garden Corporation, and the Evanston (Ill.) Hospital Association. He serves as a trustee of the University of Chicago Cancer Research Foundation and of the Illinois Institute of Technology, and is a member of Northwestern University Associates; he is National Council member at large of the Boy Scouts of America, and was appointed advisor to the national commander of the Civil Air Patrol in 1952.

During World War II he served as Colonel, A.U.S., with the Corps, of Engineers, and in that capacity purchased some billion dollars' worth of army supplies, for which he received a Presidential citation and the Legion of Merit. His clubs include the Army and Navy (Washington), Standard, Builders, Tavern, Tower, Executive, and Mid-day (Chicago).

Seven years ago Colonel Crown married his secretary, Gladys Kay, his first wife having died in 1943. Two of his sons, Lester and Robert, Lt. Comdr., Naval Reserve, are now officers in his business. His third son, John J. Crown, has just been discharged from the Air Force and is attending Northwestern University Law School.

57th A.S.T.M. Meeting

(*From page 74*)

Chemicals Division, Organic Chemicals Department, E. I. duPont de Nemours & Company; Earl F. Kelley, chief, Physical Research Branch, Bureau of Public Roads; Gordon M. Kline, chief, Division of Organic and Fibrous Materials, National Bureau of Standards; Stewart S. Kurtz Jr., technical associate, Research and Development Department, Sun Oil Company; Ernest E. Thum, editor, *Metal Progress*, American Society for Metals; Sam Tour, general manager and president, Sam Tour & Company, Inc.; and Herbert L. Whittemore, retired chief, Engineering Mechanics Section, National Bureau of Standards, Washington, D. C.

The Sanford E. Thompson award presented for a paper of outstanding merit in the field of concrete and concrete aggregates was not recommended.

The Frank E. Richart Award presented to recognize outstanding contributions made in the field of concrete and concrete aggregates was established in 1954 by the board through a gift from Mrs. F. E. Richart, to honor and perpetuate the memory of her late husband, a long-time member of the society, a member and officer of various technical committees, a vice-president, and an Honorary Member of the Society. It is to be given not oftener than once every three years. The first award was made to Albert T. Goldbeck, National Crushed Stone Association.

Catalytic Exhaust Permits Mine Use of Diesel Units

In converting a standard above-ground diesel equipped tractor-shovel for mine use, personnel at the Coplay Cement Manufacturing Company, Coplay, Pa., installed a new catalytic exhaust on the engine which permits the diesel to be operated safely underground.

This compact device, developed by Oxy-Catalyst, Inc., Wayne, Pa., removes 65 to 85 percent of the irritating hydrocarbons and 80-90 percent of the CO content of the engine exhaust. Coplay reports that carbon monoxide concentrations in the exhaust have been consistently below 0.003 percent—well under the allowable Bureau of Mines maximum of 0.01 percent for an 8-hour exposure. In this instance the samples were taken with a Mine Safety Appliance squeeze-bulb indicator, and no detectable traces of odor or smoke were found even when the equipment was operated in dead-end headings 1,000 ft. from the entrance of the mine.

• International Lodover tractor-shovel unit equipped with catalytic exhaust on 62½-hp. 4-cycle diesel engine, operating safely underground without harmful effects from engine fumes, in Coplay, Pa., limestone mine of the Coplay Cement Manufacturing Company.

The device is direct-connected with the engine exhaust manifold, its twin-flow, steel catalytic muffler housing eight units, each composed of a number of streamlined porcelain rods, coated with alumina and platinum alloy, which catalytically burn the hot engine gases to carbon dioxide and water. There are no moving parts or chemical solutions, and the units require no periodic maintenance. The element in these exhausts is a development of Eugene J. Houdry, president of Oxy-Catalyst, Inc., a pioneer in the study of catalytic cracking of petroleum, air pollution control, and waste heat recovery in industrial stack installations.

Coplay, the company that introduced portland cement to this country in 1871 and pioneered the use of the rotary kiln, met the diesel engine exhaust problem head on about three years ago. At this time the supply of high-grade limestone ore in its 375-ft. deep open quarry was depleted. To strike quality ore again, workmen tunnelled horizontally from the bottom of the quarry; it was not thought necessary to install a forced-air ventilation system. The International Lodover unit has a 4-cycle, 62½-hp. diesel that Coplay had previously operated outdoors in the open quarry. With the added equipment this unit is now used underground to load blasted limestone ore into shuttle cars for removal from the mine.

Enterprise Brick Company, Inc., Alexandria, La., has filed articles, changing its name to Stephens Gravel Company, Inc.

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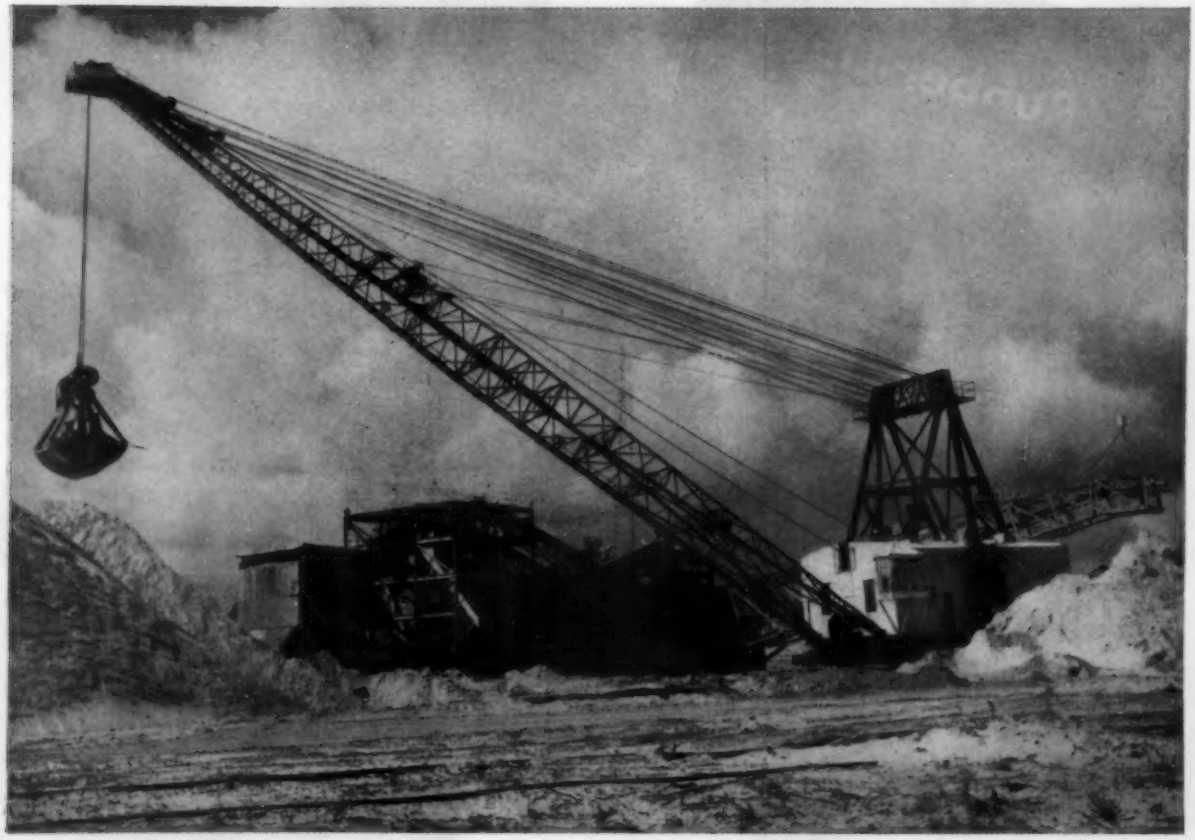

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AEC Urges Uranium Recovery From Waste Phosphate Sources

THE current program of the Atomic Energy Commission for the development of domestic phosphate resources and by-product uranium is a very definite contribution to our national security and a tribute to the ingenuity of leaders in the phosphate industry. This is especially significant since millions of tons of phosphate rock are produced annually, and the life of domestic phosphate deposits is estimated to be more than 100 years.

Principal sources of uranium are for the present outside the United States, and we are dependent upon foreign shipments for a major portion of our supply. The principal foreign sources are Canada, the Belgian Congo, and the Union of South Africa. Currently, our most important domestic production comes from the Colorado Plateau area, where there are a number of mills which concentrate and extract uranium from various ore types.

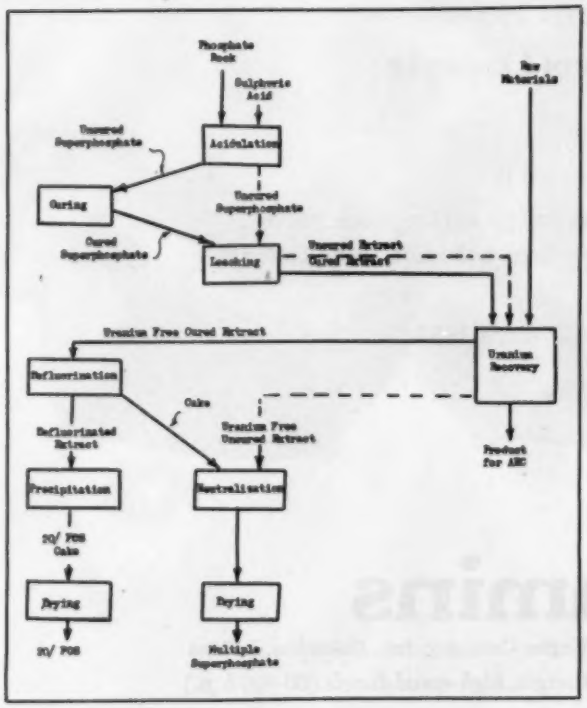
The Atomic Energy Commission is very much interested in the concentration of uranium which occurs in certain types of marine sediments, particularly the phosphorites and black shales. Although these formations are very low grade and offer most formidable concentration and extraction problems, they constitute very large reserves.

Highest concentration of uranium in phosphate occurs in deposits of the Pliocene Bone Valley formation in Florida and the Permian Phosphoria formation of Wyoming, Montana, Idaho, Colorado, and Utah of the western phosphate area. Although uranium concentration amounts to an approximate range of only 2/10 lb. to 4/10 lb. per ton of phosphate rock, the AEC has very actively sponsored basic research studies and process development projects in co-operation with the phosphate and fertilizer industry, with the objective of producing uranium concentrates as a by-product of phosphatic fertilizers and phosphate chemicals.

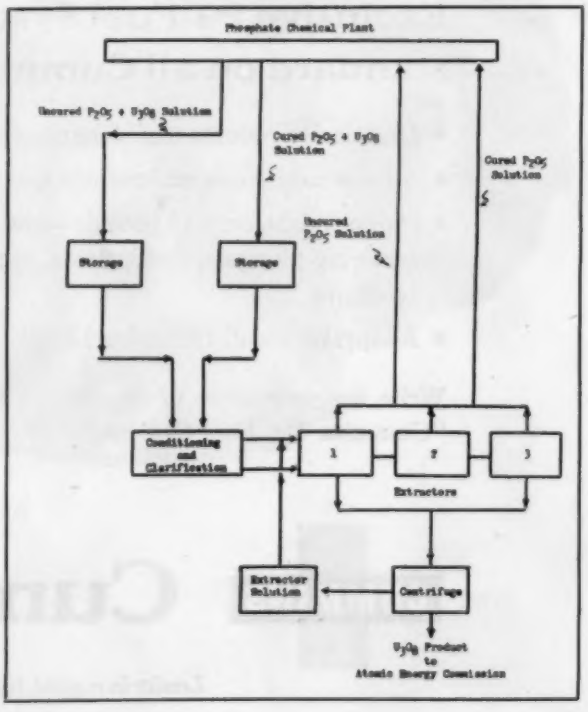
The Commission's phosphate program encompasses all opportunities for economic recovery of uranium concentrates at acceptable prices. Commercial phosphate rock and phosphate pebble have been utilized as a source of by-product uranium since September, 1952, at the Blockson Chemical Company, a producer of sodium phosphate chemicals in Joliet, Ill. Texas City Chemicals, Inc., reached full scale operations in its Texas City, Tex., plant in February, 1954. Although these two plants, producing by-product uranium, are not in Florida, they are supplied with uranium-bearing phosphate rock mined and concentrated in the Florida field.

There are two corporations operating in Florida which, under contract to AEC, have constructed uranium recovery units. The Virginia-Carolina Chemical Corporation has recently completed the construction of a by-product unit in conjunction with its new triple superphosphate fertilizer plant at Nichols, Fla. International Minerals and Chemical Corporation has a by-product uranium recovery unit which is a part of its new Bonnie Phosphate Chemical plant between

Flow sheet of the Bonnie process, Bonnie chemical plant.



Simplified flow diagram of Bonnie uranium recovery unit.



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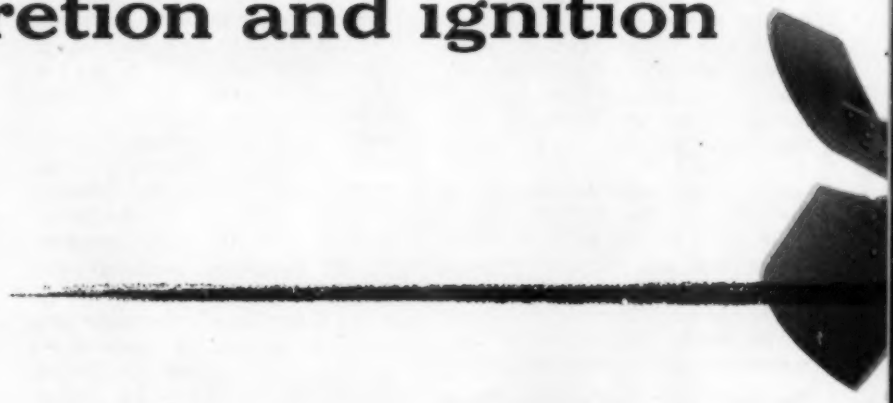

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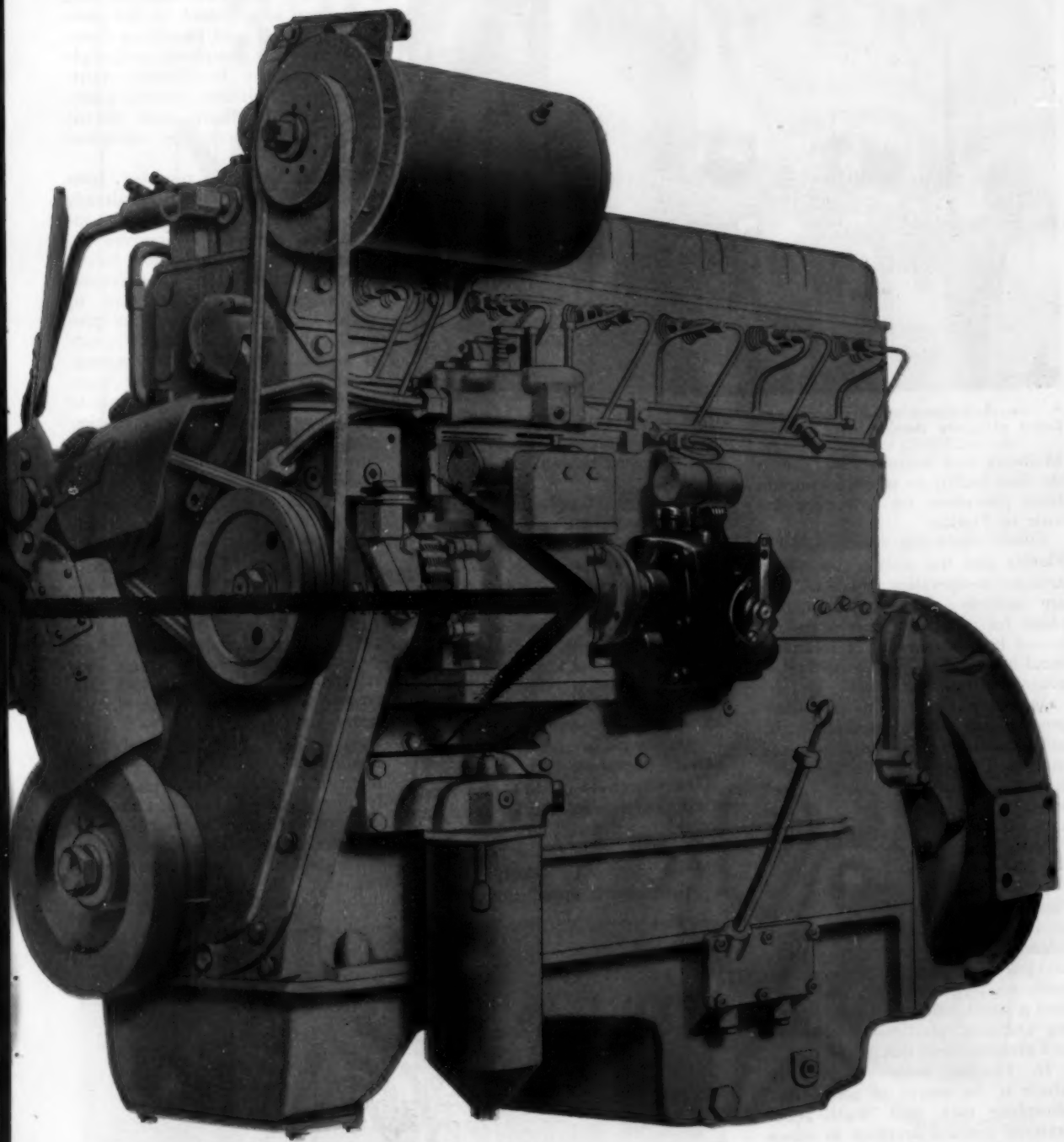
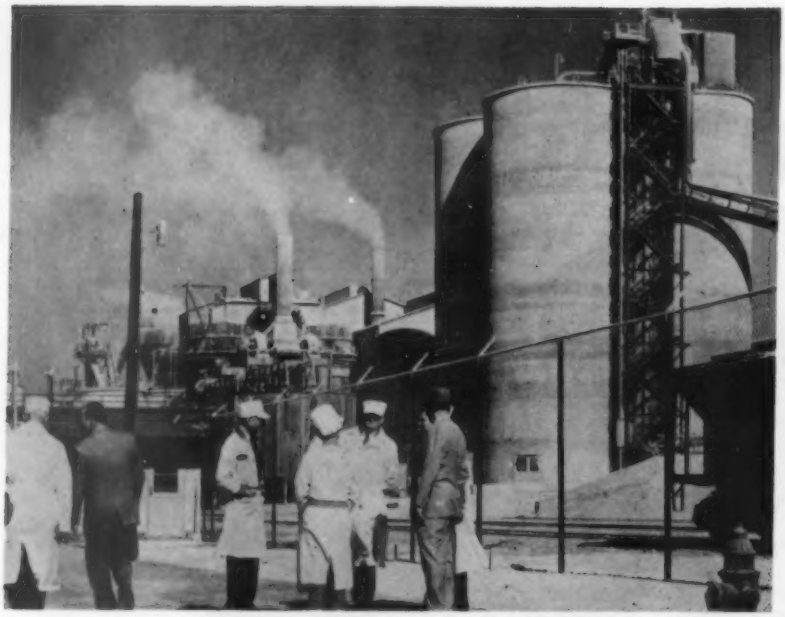




A view of the exterior of International's Bonnie phosphate chemical plant.

Mulberry and Bartow, Fla. This is the first facility to recover uranium from phosphate on a commercial scale in Florida.

Other operating companies in Florida and the western phosphate area are co-operating with AEC and are actively pursuing production plans for uranium concentrate recovery by the addition of relatively small extraction units to their phosphate fertilizer operations.

In a new phase of its phosphate program the AEC contemplates the utilization of a new phosphatic raw material known as a "leached zone" or "aluminum phosphate zone" which occurs in the Florida area as a weathered material, varying from 2 ft. to 25 ft. in thickness, overlying the phosphate rock matrix. During current mining operations this "leached zone" material is cast aside as overburden waste and is considered to have little economic value in view of present technology. International Minerals has also operated a small pilot plant for recovering uranium, phosphatic fertilizers, and alumina from this material.

In Florida, both raw matrix, which is the source of commercial phosphate rock, and "leach zone" material contain uranium in minor concentrations of 1/10 lb. to 4/10 lb. U_3O_8 per ton of material. More than 25,000,000 tons of raw matrix were mined last year from which about 9,000,000 tons of commercial phosphate rock and pebble concentrate were produced. An estimated 14,000,000 tons of "leached zone" material were moved and discarded as waste.

The large Phosphoria formation, in the previously named western states, is also the source of commercial phosphate materials. The production of by-product uranium from western operations is now feasible; and substantial production is contemplated as a by-product of the western phosphate fertilizer industry, which is expanding very rapidly due to increased demand for phosphatic fertilizer and phosphatic chemicals. Requirements are about 1,500,000 tons of phosphate rock annually.

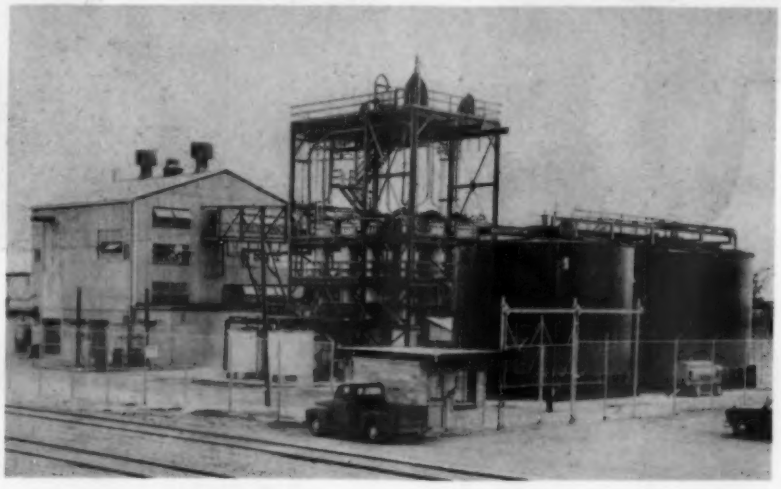
The objectives of AEC are most worthy of consideration and the potentialities most attractive for commercial exploitation since, in addition to new phosphoric fertilizer, there are co-product and by-product possibilities which include alumina, fluorine, uranium, and other metal and non-metal values. Process studies of AEC include the recovery of by-product uranium from industrial sources such as wet process phosphoric acid, phosphate chemicals from wet phosphoric acid, triple superphosphate fertilizers, nitric phosphate fertilizers, normal superphosphate fertilizers, and electric furnace operations for elemental phosphorus.

Process methods resulting from some of these studies have already been accepted by the phosphate industry as indicated by current by-product uranium production. Newer process studies include the operation of two very small pilot plants to prove the process feasibility of producing high-analysis fertilizer products from the "aluminum phosphate zone" material. Engineering feasibility studies are now in progress to determine capital and operating costs based on sound engineering principles.

AEC's program to develop economic production of domestic uranium from low-grade sources anticipates full co-operation of the phosphate industry. By sponsoring long-range basic research and process development projects, AEC offers the phosphate industry unequalled opportunity for the conservation of an essential natural resource and the realization of new by-product and co-product values through better technology.

According to the National Production Authority (U.S. Department of Commerce), the phosphate fertilizer expansion program includes construction of 56 new facilities by January, 1955, having a production estimated at 1,203,400 short tons per year. The product breakdown

(Continued on page 98)



Uranium extraction plant at the Bonnie facilities.

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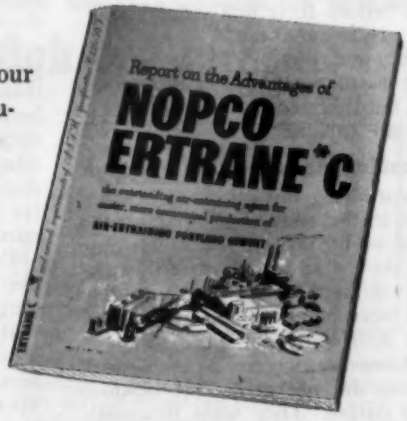

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Report on Current Labor Developments

By S. HERBERT UNTERBERGER
S. Herbert Unterberger and Company
Industrial and Labor Economists
Washington, D. C. — Philadelphia, Pa.

Higher Employee Output

IT IS commonplace to hear employers complain that their present employees are not turning out as much work as their employees did some years ago. This has been blamed on a variety of causes—laziness, bad childhood training, the influence of labor unions, etc.

Until very recently, the problem had not been subjected to scientific study. But the work done in the last few years, particularly by the Institute for Social Research of the University of Michigan, is beginning to come up with some of the reasons and with some of the answers.

Wide Variation

In studying the possibilities for increasing productive effort, it was discovered that, even among experienced workers, the differences tend to be so great that the better performers will turn out about twice as much work as the poorer performers. And of even greater importance was the discovery that the same experienced worker will, under some circumstances, turn out almost twice as much work as under other circumstances.

This indicates that there is an outside possibility of doubling the output of a company's labor force—a possibility which can not be ignored in these days when many businesses must reduce their unit labor cost if they are to survive.

The question is, "What can be done to motivate the employees to turn out this greater output of which they are capable?"

Financial Incentives Not Enough

In studying this subject it became clear to the researchers that money alone would not motivate high output. As a matter of fact, it was discovered that it was the more highly paid workers who were least satisfied with their compensation.

Moreover, incentive or piece work systems did not necessarily produce high output. They were frequently resisted by the work force, particularly where the workers were unconvinced that the standards were reasonable. Here it was found that the first-line supervisor was the critical figure in the success of such a plan. Employee satisfaction appears to be closely related to the supervisor's own acceptance of the plan, his willingness to discuss it often and openly, and the confidence he generates by the manner in which he handles complaints about the operation of the plan.

Welfare Benefit Programs

Surprisingly, research in a variety of organizations has not borne out the contention that liberal health and welfare benefits will do much to increase employee output.

Supervision

On the other hand, the type of supervision which the employee receives has a great deal to do with his output. At this point research comes up with a most unexpected result—that the supervisor who supervises his people closely and the one who puts direct pressure on them to produce, does not generally get the highest output.

The findings point out rather clearly that supervision is more effective in motivating output if it is sufficiently general to give the supervisors and the workers the latitude they require to do their work intelligently.

The effective supervisor, as regards both production and morale, is the one who tends to see his job primarily in terms of organizing a team to do the work required, rather than in terms of applying rules, technical efficiency, and direct pressure for productivity.

Furthermore, the notion that the good supervisor is the strong man who makes decisions independently is not borne out by the facts. Far higher output was secured by the supervisor who took the time and the trouble to discuss the problems with the employees in his charge and to have them participate in the final decision.

Even the individual who may be able and willing to provide higher output will generally not do so if that would exceed the standard set by the group. Only group participation in decision making and the cooperative establishment of group standards were found to be effective means for raising output generally.

The Job Itself

For a long time it has been thought that the way toward higher output was to break down the job into its parts and then have specialized employees, who could be trained quickly, perform each of those parts. It now appears that that trend has gone too far; many of the gains in potential efficiency have been lost because employees receive little satisfaction from those simplified tasks and are not motivated to give them their best efforts.

This research showed that the employees tended to have a high degree of satisfaction with the job if the skill demands were high, if the job permitted a variety of activities, and if the job (or the way it was supervised) permitted the employee to feel that he could make some decisions about how the work could be done. There were, of course, some employees who were content with routine, undemanding work.

Absenteeism

High output is generally associated with low absenteeism and *vice versa*. These studies showed that low absenteeism was generally found in places where the supervisors always had time to talk with the employees about personal problems; where group discussions with the employees were effective; where the employees felt they were really part of the group; where the jobs gave the men a good chance to do the things they were best at; and where the job itself was important.

Much research still remains to be done on the question of what makes for high employee output. This University of Michigan work points the way. It is being taken very seriously by employers who are reconsidering any of their practices which are not found to be "paying off" in increased productivity.

New Jordan Cement Plant Helps Meet High Demand

The new cement plant built by the government for the Jordan Cement Industries Company, Ltd., was officially opened in February by the Minister of Economy, who said that the cost of the plant of $1,970,000 was 13 percent under the original estimate of the engineers. German firms held most of the construction contracts, and hold shares in the venture of $140,000.

The plant has a capacity of 330,000 bbl. annually. Cement requirements in Jordan in the past have averaged from 250,000 to 275,000 bbl. annually, with a price of $7.60 per bbl. mainly upheld by the shortage of cement. It is expected that with the new plant operating, this price will be reduced perhaps 25 percent, or around $5.60 per bbl.

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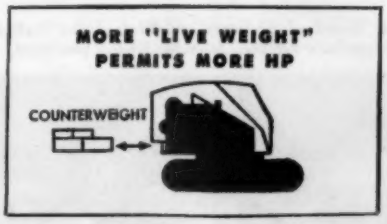

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Mid-Year N.A.L.I. Directors' Meeting Covers Important Industry Issues

another ON THE SPOT report

THE National Agricultural Limestone Institute held its mid-year board of directors' meeting at the Netherland Plaza Hotel, Cincinnati, Ohio, on June 17 and 18. A number of important industry matters were discussed, including the Agricultural Conservation Program, promotion and education, advertising, percentage depletion, and other topics. The first day was devoted to meetings of the association's numerous committees, followed on the second day by the various committee reports.

One major outcome of the meeting was the decision to engage Norman Simpson,[1] advertising executive from Lee, Mass., to assist in the promotional, educational, and advertising work of the association. One of his first jobs is to prepare and submit a news letter to the association for approval, which is tentatively planned to be published on a monthly basis. The news letter, to be prepared through the educational committee, will attempt to co-ordinate various state activities and to aquaint the members with pertinent facts relating to the industry. Plans also call for Mr. Simpson to prepare a promotional piece directed to dairy farmers; he will also study the possibilities of the industry advertising in such national publications as *Country Gentlemen*.

In presenting his midyear report, Robert M. Koch, N.A.L.I. executive secretary, expressed the belief that 1955 would be a better year productionwise for producers than 1954. He based this prediction on the fact that the 1955 A.C.P. bill, which is to be voted on by Congress shortly, calls for the minimum of $195,000,000 (an amount equaling the 1954 appropriation) plus a diverted acres bill amounting to $55,000,000. Under the latter bill a large amount of corn, wheat, and other high-parity crop acreage or potential acreage would be diverted to pasture, etc. Mr. Koch added that another bill, calling for up to the possible maximum of $300,000,000 for diverted acreage, may also be proposed and voted through. He pointed out that this measure would greatly benefit the agstone industry since liming is a necessary adjunct to successful pasture development.

Mr. Koch next discussed the mandatory soil test required by the A.C.P., which has been in effect in nearly every state since July, 1953. He warned that the test may cause an artificial roadblock to the industry. In arguing against the mandatory test, the speaker referred to two serious problems involved, namely (1) the lack of uniformity of sampling and of testing procedures and (2) the validity of the pH test, which he claims some states use as the sole criterion in the "soil test".

Elaborating on the second problem, Mr. Koch referred to Dr. Albrecht's recent research on pH soil testing, which was published in PIT AND QUARRY recently.[2] In this article Dr. Albrecht claims that undue emphasis is being placed on the pH test and that plants are sensitive to degrees of fertility deficiency and not to degrees of acidity. Thus wise soil management should aim at plant nutrition rather than acidity removal. A soil, for example, may be neutral, yet be calcium-deficient; thus a pH test of that soil would indicate that agstone is not needed, although actually it would be needed to supply the deficient calcium.

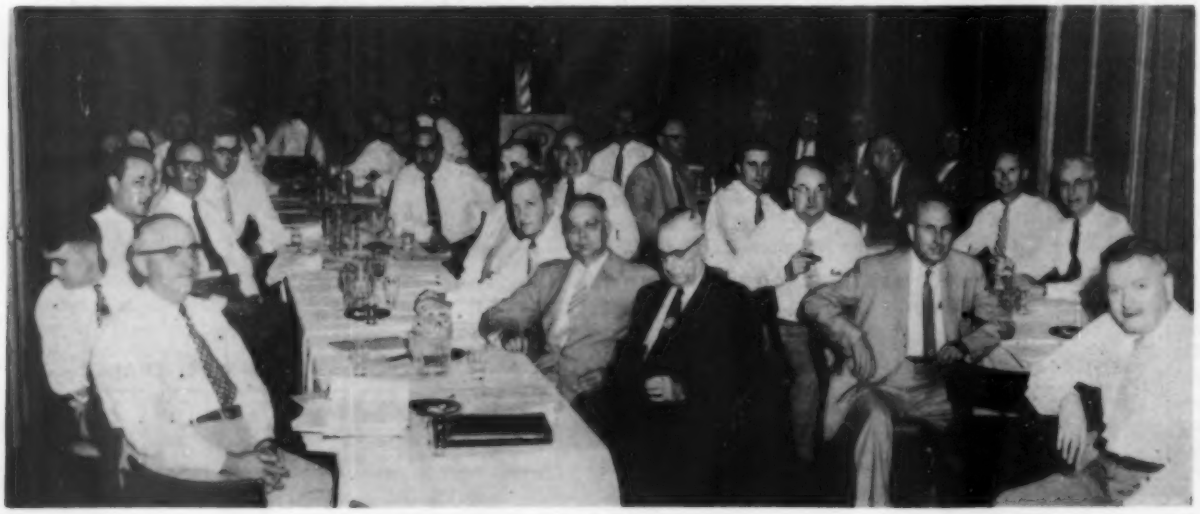
Mr. Koch also cited an experiment at an eastern university which indicated that the pH of a given soil sample varies considerably when tested at selected intervals after being collected, i.e., at 1 day, 1 week, 2 weeks, etc.

Various graphs prepared by the association relating agstone usage to A.C.P. appropriation were next discussed. Figure 1 shows agricultural limestone usage in the United States since 1929, relating the tonnages

[1]Mr. Simpson, who handles the advertising for Lee Lime Corp., Lee, Mass., wrote an interesting article for PIT AND QUARRY, entitled *It's in the Bag*, which appeared in May, 1954 (Vol. 46, No. 11), pp. 94-97.

[2]See Albrecht, William A. — *Soil Acidity (low pH) Spells Fertility Deficiencies*, PIT AND QUARRY, March, 1954, pp. 82-86.

Midyear board of directors' meeting of the National Agricultural Limestone Institute, held in Cincinnati on June 17 and 18. Standing at the speaker's table is John M. Deely, president.



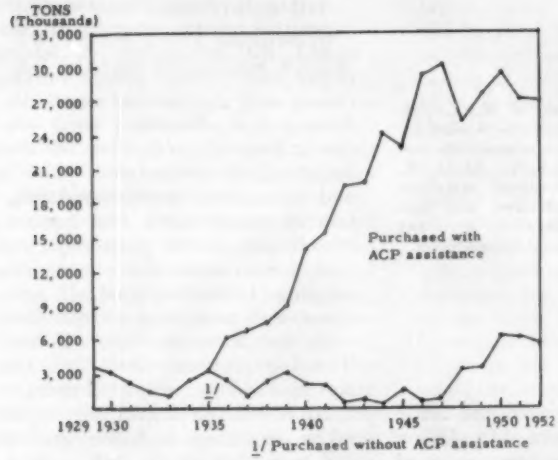


Figure 1 — Agricultural limestone used in the U.S. from 1929 to 1952, showing amount purchased with and without A.C.P. assistance.

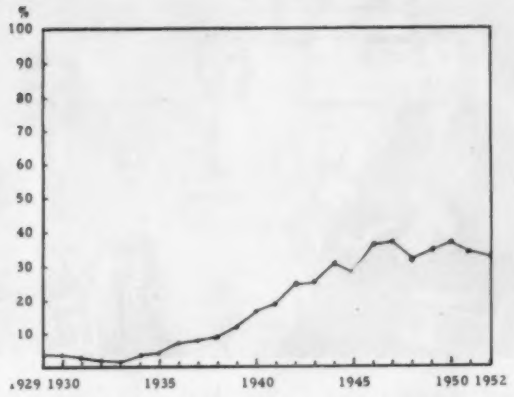


Figure 2 — Ratio of limestone tonnage to annual needs. In no year did the percentage exceed 40 percent.

purchased with and without A.C.P. assistance. Figure 2 shows what percentage limestone usage is of annual needs. This graph indicates the vast untapped market for agstone. (The maximum percentage in 1947 was only 37.64.) Figure 3 shows what percentage A.C.P. tonnage is of total agstone used in the United States, (The maximum was 97.03 percent in 1946.) Figure 4 shows the percentage of A.C.P. funds which was spent for agstone. The surprising fact revealed in that percentage is relatively low, varying from 9 to 24 percent. The accompanying table gives breakdown of the data shown in Figure 4 by states, comparing 1952 with the maximum.

Mr. Koch used this table to indicate what work needs to be done in many states; he pointed out that these figures are in no way related to the total appropriation. He felt that most states should boost the percentage to at least 35 percent.

PERCENTAGE OF A.C.P. FUNDS SPENT FOR LIME

State	Highest Year	1952
Connecticut	62.30	34.69
Georgia	12.77	12.77
Illinois	58.18	26.55
Indiana	67.52	44.00
Iowa	47.95	29.90
Kansas	23.07	15.34
Kentucky	50.86	13.73
Maine	66.94	24.04
Maryland	74.10	50.12
Massachusetts	51.11	28.95
Michigan	31.65	16.77
Minnesota	12.67	8.16
Missouri	54.45	35.13
Nebraska	2.47	2.47
New Hampshire	52.50	33.13
New Jersey	59.56	22.39
New York	58.94	54.13
Ohio	56.59	49.12
Oklahoma	15.81	7.72
Pennsylvania	76.91	55.08
Rhode Island	54.32	33.43
Tennessee	37.22	11.74
Texas	1.76	1.76
Vermont	50.65	22.29
Virginia	59.55	23.56
Wisconsin	38.07	23.74
United States	23.80	17.85
Highest 5 states (aver.)	69.55	36.04

Future convention plans were discussed by John H. Riddle, vice-president of N.A.L.I. The 1955 convention will be held in Washington, D. C., on January 17, 18, and 19, with the executive committee meeting on the 15th and the board of directors the 16th. The panel on operations will be led by K. K. Kinsey and E. C. Farrar (American Cynamid Company) and the panel on promotion by William D. Dillon. A separate panel on the A.C.P. will also be held. Senator Frank Carlson will be the guest speaker.

The 1955 midyear board of directors' meeting will be held in Cleveland on June 9 and 10, although a hotel was not named. The 1956 convention is scheduled for Chicago at the Blackstone Hotel on January 30, 31, and February 1, with the board meeting on the 21st and the executive committee on the 28th.

Russell W. Hunt, chairman of the membership committee, reported that there are now 360 producer members in the association, which represents over a 10 percent gain since the last convention. Although this phenome-

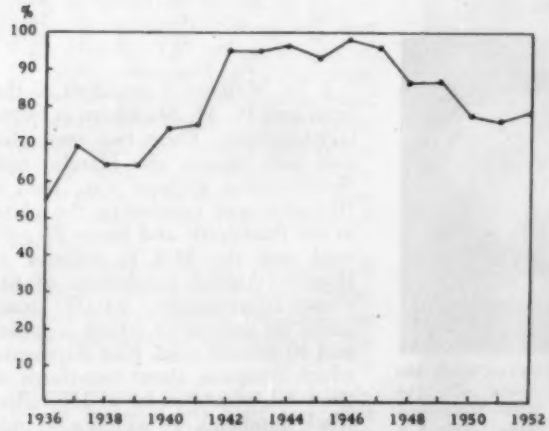


Figure 3—Ratio of A.C.P. tonnage to total agstone used.

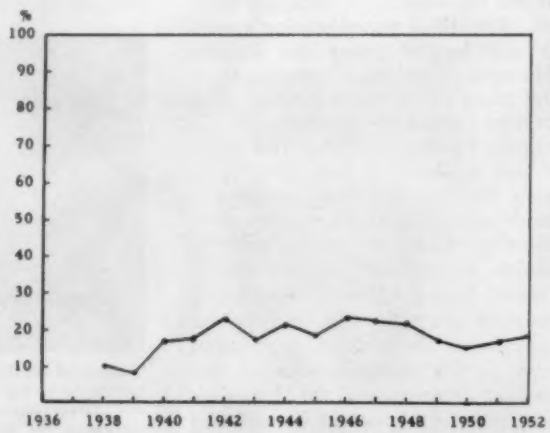


Figure 4—Percentage of A.C.P. funds spent for agstone.

Trio of N.A.L.I. officers — Robert M. Koch, executive secretary; Alvin R. Armbrust, secretary-treasurer; and Sam Omasta, assistant executive-secretary.

nal growth is giving the association "growing pains", Mr. Hunt feels that the membership may well grow to 500 within a year or two.

William D. Dillon discussed the work of the promotion and education committee. He stated that two new promotional bulletins, entitled *Those That Follow* and *Limestone Brings a New Day*, will be printed shortly. In addition, the booklet *Lime Your Pastures* will be reprinted and made available to members. Mr. Dillon stated that his committee suggested the association adopt a new emblem. He reported that the Green Pastures work and billboard advertising will be continued. It was also announced at the meeting that the University of Illinois is printing an excellent educational booklet on agricultural limestone, soon to be made available.

Arthur R. Alvis, chairman of the committee on state associations, discussed the advantages of having strong state agstone groups working closely with the national association. Among the advantages cited were the following: collection of dues facilitated, co-ordination of publicity and educational work, standardization of specifications and handling of soil tests, better grass roots support, greater convenience in regional meetings, promoting good will across states, and promoting a closer tie-in with the National Safety Council. The big problem, Mr. Alvis said, was how to attain this ideal situation.

No new developments were reported on percentage depletion, since the 850-page federal tax bill had not been approved by Congress at the time of the meeting. Earl L. Heckathorn, chairman of the percentage-depletion committee, said however, that agstone producers would undoubtedly be allowed 15 percent depletion allowance, since agricultural limestone is chemical grade stone.

West Texas Gravel Plant

(From page 53)

concrete sand in both screw classifiers; in this event the splitter gates leading to the third flume are closed.

The 2-deck vibrating screen used on coarse gravel production and the three screw classifiers are mounted parallel to each other and discharge into a battery of four steel bins, having a total capacity of 150 cu. yd. The bins, two of which have two compartments, are mounted in a line over a rail track. For loading from stockpile the firm uses an Allis-Chalmers HD-5 front-end loader and a Koehring ¾-cu. yd. clamshell.

An interesting sidelight of the Hamlin operation concerns the water supply and the reclaiming pond. Water for washing is obtained from an 18-in. thick water-bearing gravel deposit located along the Double Mountain Fork about one mile from the plant. The water-bearing zone overlies limestone bedrock and is topped by 6 ft. of clay and sand. Water is obtained from six 250-ft. long tile drainage lines, which are made of porous 18-in. concrete tile; the tile, which rests on the bedrock, drains to a 25-ft. deep concrete cistern, from which the water is pumped through a 4,700-ft., 4-in. pipeline to the pick-up pond adjacent to the plant. Because of this unique arrangement, the firm does not have to rely on the intermittent water source of the stream.

Two Fairbanks-Morse centrifugal pumps supply water to the washing plant, providing about 1,500 g.p.m. One is a 4- by 5-in. unit driven by a 30-hp. motor, which supplies 600 g.p.m. to the primary screen; the second is a 6- by 8-in. pump driven by a 35-hp. motor which supplies the remainder of the plant. Provision is made to connect both pumps to the same line if the need arises.

All wash water from the plant is flumed to an 800-ft. long horseshoe-shaped settling basin, whose lower end is connected to the pick-up pond. Under this setup the silt is deposited before the water reaches the pick-up pond. Frequently the settling basin is cleaned out with a dragline; the recovered silty material is suitable for fill purposes and for bedding in cattle cars.

Closeup of the fossilized elephant tooth obtained from the Hamlin gravel pit. The corrugated surface shown in the foreground represents the grinding surface. Note 6-in ruler used as a scale.

The company produces a wide range of materials, including several sizes of gravel, and concrete, mason, and plaster sand. Under normal operation the various sizes are produced at the following rates: gravel, 110 t.p.h.; pea gravel, 35 t.p.h.; concrete sand, 90 t.p.h.; and mason sand, 60 t.p.h. Besides the conventional uses in portland cement and asphaltic concrete, both the sand and gravel are used as filter media. Another interesting use is shooting gravel, wherein material under ⅝-in. is used to cap over the dynamite in shooting oil wells. A typical grain size analysis of the concrete and mason sands is as follows:

Passing	Concrete Sand	Mason Sand
No. 4 Mesh	100%	100%
8	87	97
16	66	85
30	47	70
50	21	27
100	5	4

J. W. Maddox is president of the firm, and W. M. Blackburn is secretary-treasurer. These two men also own and operate the Hamlin and Northwestern Railway Co., Inc., a 10.2-mile spur connecting the plant to the Panhandle and Santa Fe railroad and the M.K.T. railroad in Hamlin. Annual production of the plant approximates 300,000 tons, about 60 percent of which is gravel and 40 percent sand. Rail shipments, which comprise about two-thirds of the total, extend as far as 150 miles; truck shipments are within a 60-mile radius of the plant.

Michigan Limestone Div. To Open Port Dolomite As Major Shipping Point

"Port Dolomite", a new name on the Great Lakes, next spring will become the shipping point of upwards of 3,000,000 tons of high-grade dolomite limestone annually.

Naming of the port was announced by Hugh S. Lewis, president of Michigan Limestone Division of United States Steel Corporation, which expects to open its new dolomite quarries and complete construction of processing plants on the Upper Peninsula of Michigan late this fall. Port Dolomite is located between McKay and Bush Bay on Lake Huron 34 miles south of Sault Ste. Marie.

Under the supervision of Michigan Limestone's chief engineer, Thomas C. Jackson, and C. R. Dolsen, operating manager of the quarry and plant port, 125 construction employees are developing a large acreage of limestone-bearing property with the goal of shipping the first boatload of limestone next spring.

Construction crews which began work in April, 1953, by moving in most of the equipment and supplies on trucks, are presently pushing the railroad line from the quarry down through five miles of rugged terrain and swamp. A primary crusher is being erected on the floor of the quarry, which is 46 feet below the surface.

Plans call for the stone to be hauled over the new rail line from this crusher to the Port Dolomite area, where a secondary and tertiary crusher and screening plant of about 1,800-t.p.h. capacity will process the stone into eight grades ranging from 3- by 5-in. flux stone to rice size just over 1/16th of an inch.

One of the outstanding units among the new facilities is the 117- by 620-ft. dock at the edge of a natural water channel leading out into Lake Huron. The unique feature of the dock is the traveling loading shuttle, which permits a boat to be filled in about five hours without being moved back and forth to receive the various sizes of limestone available at the plant. The dock lies in a snug harbor and is protected by off-shore islands.

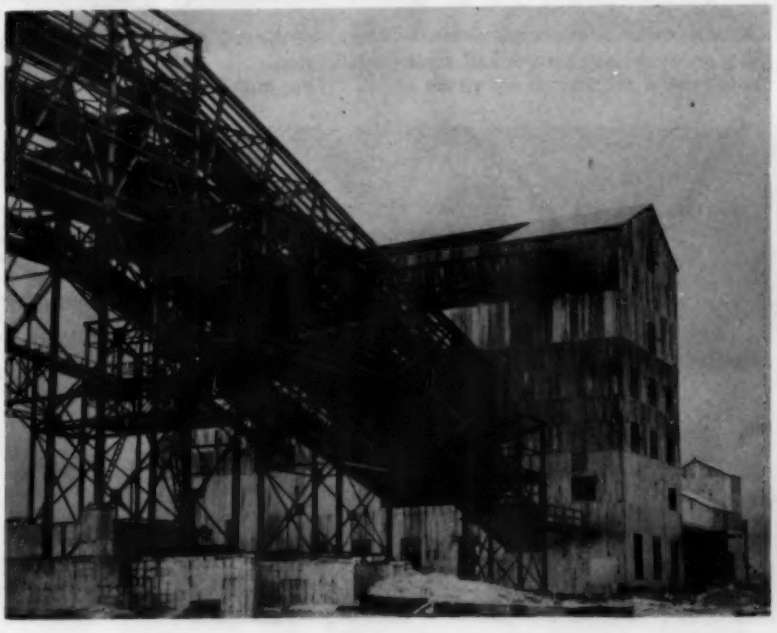
Seven self-unloading freighters of Michigan Limestone's Bradley Transportation fleet deliver the dolomite from this dock to customers on the Great Lakes. Among these is the 666-ft. *John G. Munson,* one of the largest self-unloaders afloat. Also calling at Port Dolomite will be ships of U. S. Steel's Pittsburgh Steamship fleet, as well as other lakes carriers.

While there is a vast amount of limestone of varying quality on the earth's crust, there are only limited occurrences of high-purity material so located as to permit economical quarry production and water-borne transportation to industries located on the Great Lakes. The Michigan Limestone Division's deposit at Port Dolomite lies near the surface with very little overburden. It is a part of the Engadine Formation in the Niagara Series of the Silurian System of limestone. In chemical content it is about 45 percent magnesium carbonate and 55 percent calcium carbonate, with only about 0.5 percent of impurities. It is exceptionally low in silica, phosphorus, and sulphur content. Thus, it has a magnesia content in excess of 21 percent.

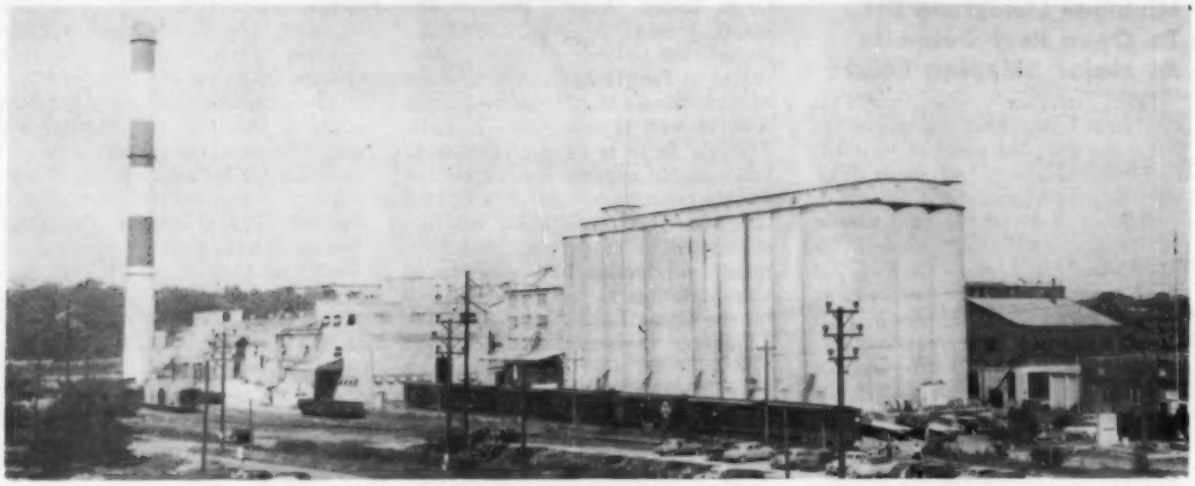
These qualities not only add to the value of the stone for metallurgical and chemical usage, but make it desirable for concrete aggregate, agricultural lime, and the many other industrial applications. The magnesium-bearing stone products of the Cedarville project are an ideal complimentary product to the high-calcium products of Michigan Limestone's quarry at Calcite, Mich., which is part of the Dundee formation—also of high chemical purity.

Operation of the quarry and facilities at Cedarville is under the administration of the northern district of the division, with headquarters in Rogers City, Mich. J. A. Valentin is district manager.

The 620-ft. dock of Michigan Limestone's development at Port Dolomite is nestled in the natural harbor of McKay Bay on Michigan's upper peninsula.



In the seven-story screen house the dolomite will be processed into eight sizes which move to storage on the conveyors in the foreground.



A general view of the recently enlarged plant of the Manitowoc Portland Cement Company at Manitowoc, Wis.

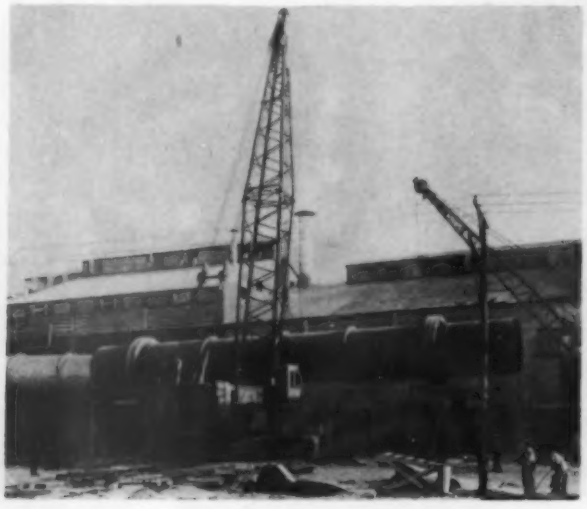
Expansion Program Can Do More Than Just Increase Production

Wisconsin cement producer reaps benefits in fuel consumption and all-round productivity per man

another ON THE SPOT picture!

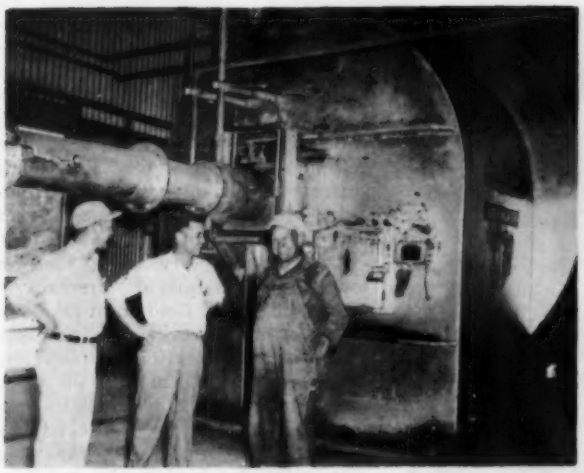
IN their eagerness to be the first to publish detailed reports on plant expansion programs, representatives of the technical press too often appear on the scene so soon after new facilities have been placed in operation as to deprive themselves (and ultimately their readers) of the opportunity to compare the performance of new equipment with old. When we bore down on the Manitowoc Portland Cement Company's plant at Manitowoc, Wis., several months ago to lay the groundwork for an expansion program article, this occupational hazard had fortunately been eliminated by virtue of the fact that the principal new equipment elements had already been in production for over a year. Because of this, and because of the exceptionally helpful attitude of key personnel at the plant, we came away with enough comparative performance data to lift our story well out of the equipment inventory classification.

The building program which is the subject of this report was the first major undertaking of its kind at Manitowoc since 1923, when three 10- by 160-ft. rotary kilns were installed. The plant has been a wet-process operation throughout its history, and it has one of the very few truly straight-line flow sheets in the entire cement industry. Because of this, and because the productive facilities were excellently maintained, overall plant efficiency was quite good—this despite the fact that there was relatively little modern instrumentation. The total production of the three 30-year-old kilns averaged around 3,600 bbl. per day, coal consumption ran in the neighborhood of 115 lb. per bbl., and productivity was approximately 4.25 bbl. per man.



A construction view showing the placement of one of the four sections of the new 340-ft. long by 10-ft. diameter kiln. This section weighed approximately 100 tons.

In September, 1952, a new 10- by 340-ft. Allis-Chalmers kiln was placed in operation at Manitowoc. This was a modern installation in every respect, and a complete job of instrumentation was done. Since at the outset no significant changes were made in the operation of the three old kilns, some conclusions may surely be drawn from a comparison of their performance with that of the new kiln.



The new vibrating screens which were installed in the raw mill.

Left: Gordon Rower, assistant superintendent, J. V. Dailey, superintendent, and Paul Prowls, chief burner, before the firing hood of the new kiln.

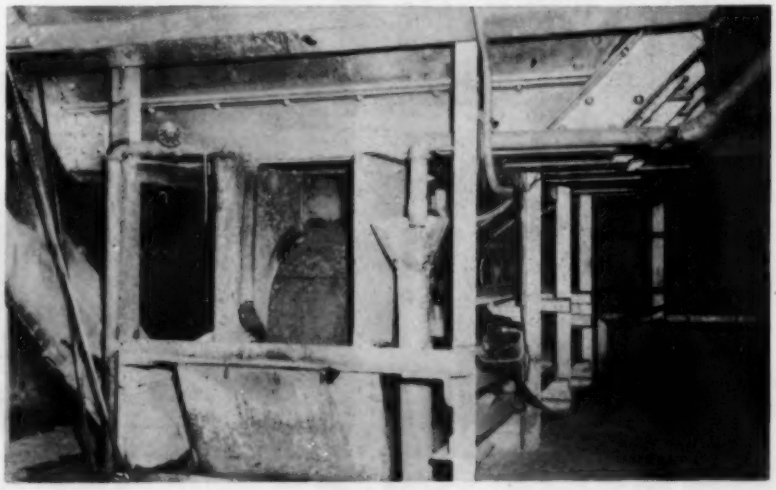
The new kiln stepped up total plant production about 50 percent by adding approximately 1,800 bbl. per day of burning capacity. It has a fuel ratio of 90 lb. of coal per bbl. of cement, compared with 115 lb. per bbl. for the older kilns—a reduction of almost 22 percent. And, finally, with the new kiln in operation productivity promptly rose to around 5.0 bbl. per man—a jump of over 17 percent.

These results so eloquently argued the case for modern instrumentation that a decision was soon reached to install instruments on the old kilns. Oddly enough, the initial pressure for modernization of the old burning units came from the operators themselves, although management was quick to endorse the idea. The claim is often made that men who have been long accustomed to manually-controlled operations are prone to resent and distrust automatic controls. In this instance, however, the operators right from the start were enthusiastic about instrumentation because of the greater assurance with which it enabled them to discharge their own responsibilities. Although at this writing there is no detailed information available concerning the results of instrumenting the old kilns, there is no doubt at all that a substantial fuel saving will be achieved. It was the company's intention to go as far as practicable, installing such features as indicators and recorders for outlet temperature and kiln speed. Plant officials believe that the maintenance of uniform outlet temperature is probably the most important single factor in kiln operation.

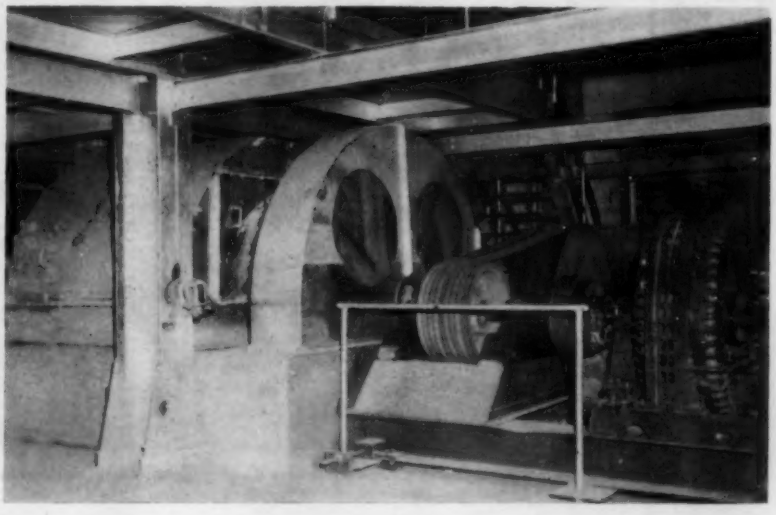
Raw Materials

Stone for the Manitowoc cement plant is shipped in by water from Inland Lime & Stone Company's quarry at Port Inland, Mich. Since the product is delivered in the form of 1½-in. screenings, there are no ordinary crushing circuits in the plant. Coal and sand are also shipped in by water, while shale is brought in by rail from the parent company's (Medusa Portland Cement Co.) plant at Dixon, Ill., and clay is pumped in from a pit about a mile and a half from the cement plant.

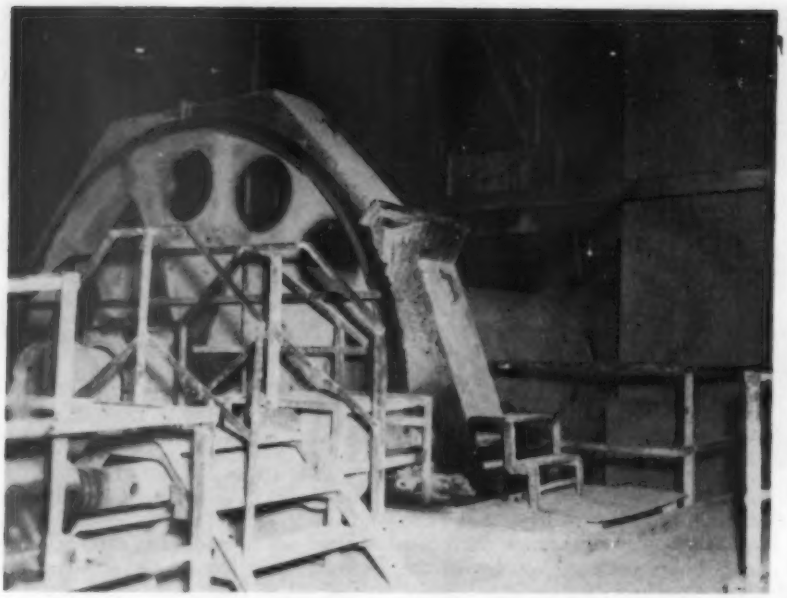
When Medusa acquired the Mani-



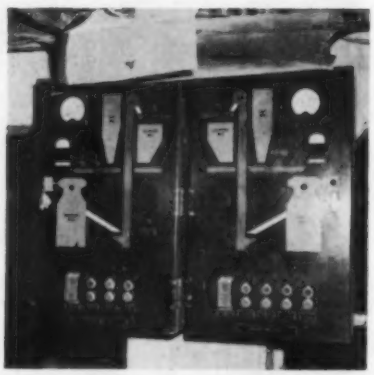
One of the three new pan conveyors which feed material to the mills in the raw-grinding department.



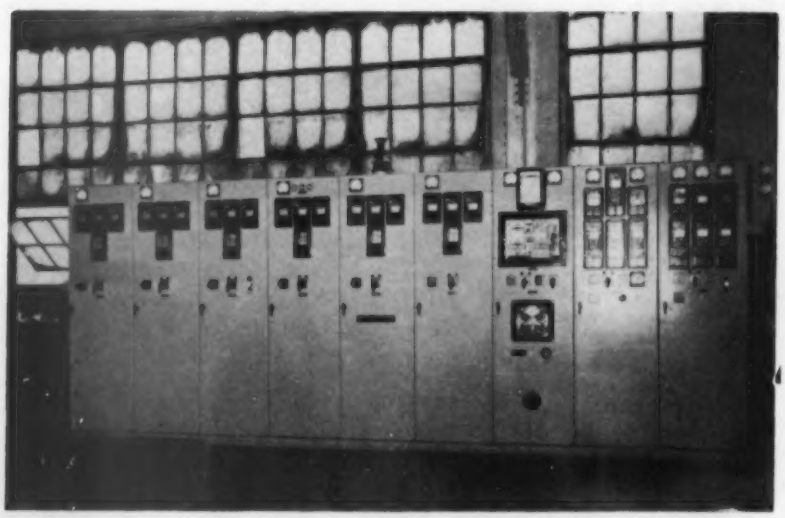
The new 8- by 5-ft. Kominuter for raw grinding.



The new 7- by 22-ft. tube mill installed to keep raw grinding capacity in step with burning capacity.



Left: Control panel for the new kiln. Right: Two of the indicator panels which show the flow of material in the finish mill.



Installation of a new switchboard in the power house was another detail of the modernization.

towoc property in the early 20's, excellent docking and materials-handling facilities were already in place, and the cement plant was laid out with a view to making the most effective use of these services. The essential element of this ready-made materials-handling system was an outsize Meade-Morrison gantry crane mounting a 5-ton bucket. This unit, which is still in service, was used for some years to unload shipments of stone, coal, and sand from lake vessels, as well as to distribute and blend materials in the storage piles and finally to feed them into the plant handling system. Since most in-coming vessels are now of the self-unloading type, the gantry now just serves for distribution, blending, and feeding.

Fortunately the existing system for handling and storing new materials was found to be entirely adequate to take care of the additional needs resulting from the recent expansion program. Accordingly, no changes were required except in respect to operating hours. This was also true in the case of the facilities for reclaiming and preparing coal.

Raw Mill From the standpoint of flow sheet sequence, the first major machine additions necessitated by the expansion program were in the raw mill, where a considerable amount of reorientation work on existing equipment was also required. Two existing F. L. Smidth Kominuters and drives were relocated, and a 25- by 100-ft. building addition was constructed to house an additional 8-ft. diameter by 5-ft. long Kominuter and an additional 7- by 22-ft. Allis-Chalmers tube mill.

Thus in the revamped set-up there are three Kominuters and three tube-mills operating in paired closed circuits. Existing electric vibrating screens were removed and replaced by six new 4- by 6-ft. single-surface Ty-Rock screens, two of these units serving each of the three raw grinding circuits. Drag chains deliver rejects from each pair of screens to the Kominuter located directly below. Other additions to the raw-grinding department included the installation of new Jeffrey pan feeders for each of the three Kominuter machines.

New Kiln The new 10- by 340-ft. kiln at Manitowoc is completely housed in a 25- by 900-ft. building addition which was constructed as a part of the expansion program. It has a capacity of 77 bbl. per hr. on a straight slurry feed containing approximately 36 percent water, this material being placed in

the kiln by means of an Allis-Chalmers bucket-type feeder. Drum-type filters in the feed circuits ahead of the older kilns reduce the moisture content of the material fed to these units to around 18 percent.

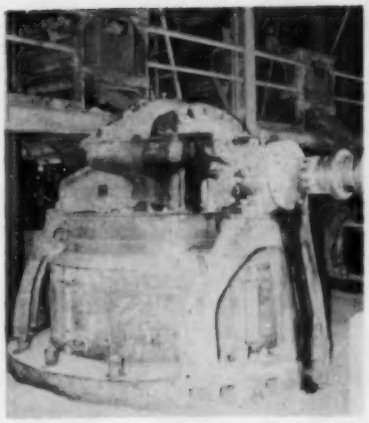
The new kiln is supported on five concrete piers and is driven by a 150-hp. Allis-Chalmers shunt-wound (d.c.) electric motor. The speed of this main drive motor is synchronized with the speed of the bucket-type feeder.

Equipment auxiliary to the operation of the new kiln includes a 3-roll Raymond bowl mill for firing and a 70-ft. long Allis-Chalmers air-quench cooler. At the burning end there is a complete and modern control board with instruments for indicating and/or recording such important information as rear-end temperatures, speed of kiln, draft, inlet and outlet temperatures on the bowl mill, and cooler speed. Two new concrete tanks measuring 22 ft. in diameter by 30 ft. high, and equipped with Manitowoc slurry agitators, were constructed for the storage, blending, and feeding of slurry. Slurry is moved from one tank to the other, and delivered to the kiln feeder by means of 4-in. Wilfley pumps.

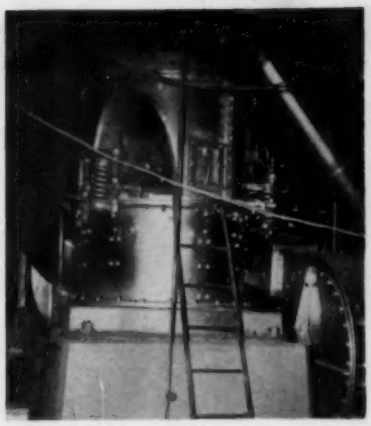
Since the 250-ft. stack which served the three older kilns was directly in the way of the proposed new kiln, this unit was torn down after a new one had been built to serve all four kilns. The new stack is lined with a brick shell and is 14-ft. I.D. by 300-ft. high. It was designed and built by Rust Engineering.

As an integral part of the expansion and modernization program, all four of the kilns have been equipped with electric precipitators, and these installations include handling facilities by means of which all dust is re-fed to the kilns. In the case of the new kiln the recovery circuit consists of eight No. 12A2 Buell Van Tongeren cyclones, followed by a Model 2 FAA 48-125 S.F. electric precipitator of the same make. Mechanical dust collectors were included in this installation in order to reduce the load to be handled by the electric unit. A handling circuit consisting of conveyors and elevators refeeds the recovered dust to the kiln.

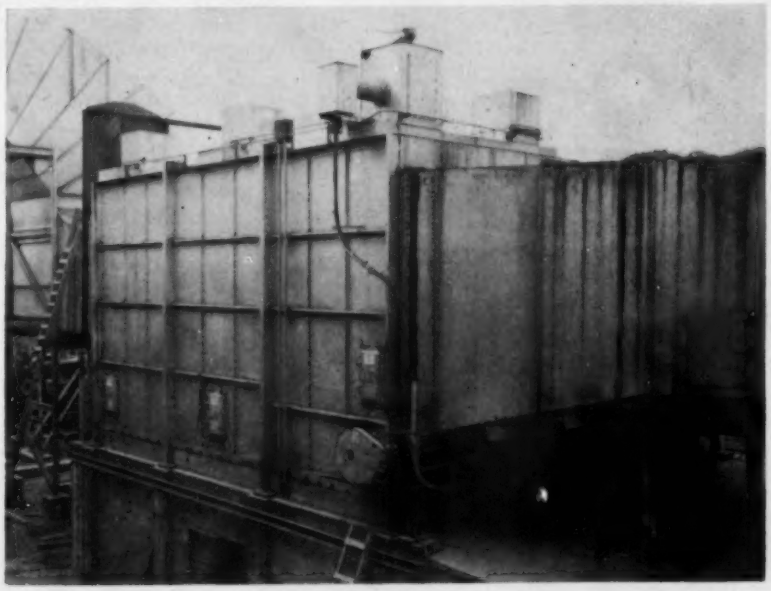
A single Model 2 FAA 6.4-200 S. F. electric precipitator was installed to handle all three of the original kilns. This unit is preceded by three Western Precipitation Multiclone mechanical collectors — one serving each kiln. These centrifugal collectors, as well as similar equipment at the firing ends of the older kilns, had been in service for some years, their installation having been



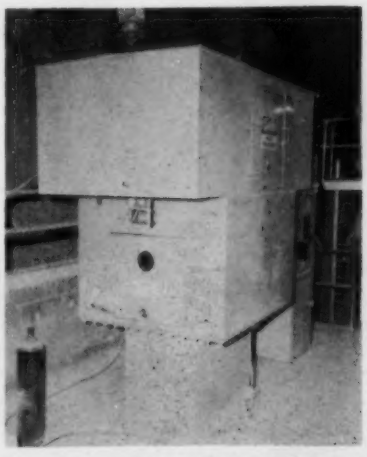
New "H" type mill installed in the finish grinding section.



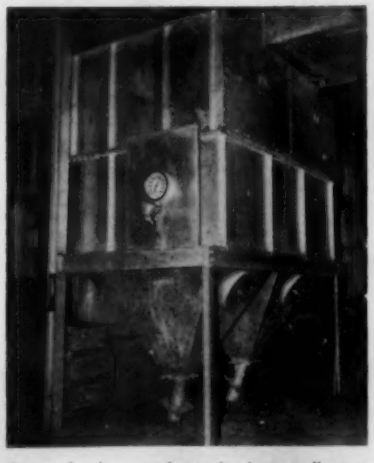
This mill pulverizes the coal with which the new kiln is fired.



Housing and duct work for the new electric precipitator which serves the three older kilns.



Transformer-rectifier cabinet which serves the electric precipitator on the new kiln.



One of the mechanical dust collectors which serve to reduce the load on the electric precipitators.

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necessitated by the fact that the kilns are operated in conjunction with Vanderwerp Recuperators. Dust recovered from the kilns is returned and refed by means of elevators and a Fuller-Kinyon pump.

Finish Mill Major changes to the finish mill at Manitowoc included the installation of an additional 7- by 22-ft. Allis-Chalmers tube mill, a Type H Bradley mill, and two 14-ft. Raymond separators. In addition, it was necessary to relocate the two existing Bradley mills.

With these additions primary equipment in the finish mill consists of three Bradley mills, three tube mills, one 16-ft. separator and two 14-ft. separators. The layout of these facilities is unusual in that two of the mills can be changed from single to two-stage grinding by a simple change in conveyor flow.

At the present time the Manitowoc plant grinds plain gray cement, air-entraining cement, and waterproof cement. Masonry cement is under consideration as a future possibility. Products of the finish mill are pumped to the storage silos and packhouse by means of a new 7-in. Fuller-Kinyon pump. The plant is a close-coupled operation in the sense that there is now almost no clinker storage, a result of the fact that the relatively small space formerly available was sacrificed in the course of the expansion program. The principal effect of this arrangement is that the finish mill simply must operate hour-for-hour with the kilns, although there is some extra grinding capacity for cushioning purposes.

Power Prior to the completion of the expansion program which is the subject of this report, the Manitowoc plant generated approximately two-thirds of its power requirements, utilizing waste heat from the three old kilns to drive a 2,500-kw. turbine. Waste heat utilization in connection with the new kiln was considered uneconomic in view of the anticipated low exit gas temperatures (about 450 deg. F.). Accordingly, the additional load resulting from the expansion program has been handled by means of purchased power, which now accounts for roughly half of the total consumption, over 100,000 kw. daily.

As an integral part of the overall modernization program, all the wiring in the plant, with the exception of the packhouse, was renewed, and most of the existing switchgear was replaced with new equipment. Substations were also redistributed, transformers for purchased power were enlarged from 1,500 to 3,750 kv.-a., and an entirely new switchboard was installed in the powerhouse. Purchased power, which formerly came into the property at 4,000 volts, is now received at 69,000 volts, which the transformers drop to 2,300 volts.

Credits Excavation work and pile driving were done by McMillin & Pitts of Manitowoc, while the concrete work on piers and footings was handled by the Casper Construction Company and the Hamann Construction Co., both of Manitowoc. The McDowell Company of Cleveland was contractor for steel work and equipment setting. Dingle-Clark Co. of Cleveland was responsible for the rewiring and power redistribution work. The basic general design of the new facilities was the work of Medusa's own engineering staff.

Uranium Recovery

(From page 86)

is as follows: Triple superphosphate projects, 13; ammonium phosphates, 7; nitraphosphates, 11; normal superphosphates, 20; phosphoric acid and miscellaneous, 8. It is hoped that as and when additional facilities are contemplated by the industry, the companies concerned will consult with AEC with respect to the process studies now being sponsored by it. Attainment of AEC objectives is directly dependent upon the ability of the industry to apply processes under study to the economic production and marketing of the resultant phosphatic fertilizers, and the by-product extraction of uranium concentrates.

The Tennessee Valley Authority is another government agency which has a small pilot plant unit to study extraction of uranium and phosphate from the "leached zone" material; and, as was previously said, the Virginia-Carolina Chemical Corporation is actively engaged in additional approaches to "leached zone" process technology. The U.S. Department of Agriculture at Beltsville, Md., and TVA are conducting storage and agronomic tests. Others cooperating with AEC in these long-range studies include the Aluminum Corporation of America, Texas City Chemicals, Inc., Blaw-Knox Company, and General Chemical Division of Allied Chemical and Dye Corporation.

This is a most ambitious program, presenting a real challenge to everyone associated with it. Success depends largely upon the close co-operation of the phosphate industry working with AEC and other agencies co-ordinating the work.

More Information, Please

Use the prepaid postcard to get this literature or additional details about new equipment and products reported elsewhere in this issue.

FINE SAND SAVED from waste overflow at classifiers by Whirlcones improves gradation and increases output at very low cost, according to *Cottrell Engineering* brochure and data sheets. (1)

PULVERIZING nonmetallic minerals at 15, 20 or 30 tph is discussed in this bulletin on *Raymond* Super Roller mills, built in several capacities with five and six rollers. (2)

INSTRUMENTATION for the modern plant is presented in this new 16-page *Bailey Meter* bulletin, a valuable addition for your library. (3)

CYCLONE THICKENER equipment made by *Heyl & Patterson* features the "jet injection" cyclone described in this bulletin. (4)

NEW PRINCIPLES of power transmission are built into the recently introduced Poly-V-Drive described in this *Raybestos-Manhattan* brochure. It offers interesting possibilities for V-belt users. (5)

PRODUCTIVE MAINTENANCE procedures are outlined in this *General Electric* publication. The 12-page booklet gives the five steps you must take to meet the demands that automation will make on your electrical maintenance program (6)

HOPPER SCALE indicating and recording systems are described in this technical reference from *Richardson Scale Co.* (7)

SAND AND GRAVEL operators will be interested on this *Sauerman Bros.* report on how a small plant increased capacity and efficiency with a moderate investment for new equipment. (8)

INDUSTRIAL POWER products built by *International Harvester*—tractors, scrapers, wagons, bulldozers, engine units and accessory equipment—are shown in a new 48-page catalog. (9)

INCREASE CAPACITY of your dragline by using *Page* automatic buckets, this literature urges. Payloads are boosted 10 to 30 percent. (10)

CONVEYOR BELT fastening is speeded with new tools devised by *Flexible Steel Lacing Co.* and described in this bulletin. They make the job easier and faster. (11)

ENGINEERING APPLICATIONS of ductile cast iron are reported in this *International Nickel Co.* bulletin. (12)

ENGINE-DRIVEN WELDERS in six sizes for faster quality welding are shown in this catalog of the *Lincoln Electric* Shield-Arc line. (13)

BELT CONVEYOR USERS will be interested in this discussion of *Du Pont* Cordura high tenacity rayon as a reinforcing fibre for belts in mine and quarry service. Several case histories are given. (14)

BELT SLIPPAGE is stopped with *Beltraction* liquid treatment according to this leaflet of interest to all transmission belt users. (15)

HARDFACING ALLOY. Applied in several different ways, versatile *Colmonoy* #6 serves all purposes in pit and quarry. (16)

SOIL SAMPLING equipment fills this 16-page catalog of the *Acker* line. (17)

CAM CLUTCHES for backstop, and one-directional drive, indexing and ratcheting, over-running and free-wheeling are shown in this *Morse* folder. (18)

CONVEYOR CHAIN of alloy cast steel is shown in this *Farrell-Cheek Steel Co.* catalog. (19)

TESTING SCREEN. The *Wheeler* Vibrator for sieves 6 to 16-in. in diameter is described in this leaflet. (20)

BREAKDOWNS can be spotted before they happen by using the *Sperry* Ultrasonic reflectoscope. This report is on cement mill and quarry equipment. (21)

SHOVEL-CRANE. The new *American Hoist & Derrick* American 750 1½-yd. shovel, 35-ton crane, is described in this catalog. (22)

LEVEL INDICATOR for liquids, granular solids, etc. The *Fielden* Telstor electronic unit gives continuous remote indication. (23)

SPOT TROUBLES in diesel engines with the help of this new "Maintenance Clinic" chart prepared by *Worthington Corp.* It covers symptoms and possible causes of common troubles. (24)

WEIGHT AND CONVEY. *Merrick Scale* 24-page booklet discusses in detail the principles and operation of the Weightometer for weighing bulk materials in transit on belt conveyors. (25)

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MANGANESE STEEL replacement parts for sand, gravel and crushed stone plant equipment are shown in this *Kensington Steel Co.* Oro line bulletin. (26)

SCRAPERS of the open-top, twin-cable variety are described in this *Heil* brochure. (27)

NO SEALING WATER is used in the Centriseal pump for delivering undiluted pulp described in this *Allen-Sherman-Hoff* brochure. (28)

BELTLESS PILER capable of throwing lump or granular material wet or dry, as far as 47 feet at a 40 tph rate, is described in this *Pettibone Mulliken* Speedpiler bulletin. (29)

MILL MOTORS. Synchronous motors for ball and rod-mill drives are discussed in this *General Electric* bulletin. (30)

COUPLINGS for air and other hose lines shown in this *Hose Accessories* Le-Hi catalog feature a new quick-lock principle. (31)

SLINGS with breaking strengths as high as 243 tons are shown in this *Macwyte* bulletin. Safe loads are shown in tons for various angles of use. Much helpful data. (32)

CONCENTRATING TABLES. A new *Denver Equipment Co.* bulletin explains how tables are used to treat materials subject to gravity concentration. (33)

BITUMINOUS PLANT. The new medium-sized portable *Pioneer* Model 81, described in this bulletin, has a rated capacity of 60 to 80 yd. per hour. (34)

DRAGLINE operators will be interested in this *Electric Steel Foundry* information bulletin on replacement parts for dragline buckets of any make or model. (35)

HERRINGBONE GEAR DRIVES in single, double and triple reduction types in a wide range of sizes, ratios and capacities for every application are shown in great detail with much supplementary information in this comprehensive catalog of the *W. A. Jones Foundry* line. (36)

YOU ASKED FOR this drill, *Ingersoll-Rand* says in this bulletin describing the new QM-2 Quarrymaster, a dual purpose primary blast hole drill for either rotary or percussion drilling. (37)

PORTABLE PLANTS for crushing stone and gravel, made in France, are described in this *Ateliers Bergeaud* literature. (38)

CONTROL CENTERS. The why and how of centralized motor control for plant operations is discussed in detail in this 32-page *Westinghouse* brochure. (39)

LOCOMOTIVE CRANES. Torque converter and "controlled power" are among the highlights of the *Browning* TorQflo cranes described in this bulletin. (40)

CUT COSTS with the new, simplified *Hobart* welders. this bulletin urges, describing the "more for your money" features. (41)

CAM FOLLOWER ROLLERS for sustaining high-speed and heavy loads are described in this leaflet from the *Smith Bearing Co.* (42)

MOTOR STARTERS of all varieties for every type of installation are described in this 8-page *Allis-Chalmers* bulletin. (43)

DIAPHRAGM PUMPS. Wheelbarrow mountings, swivel handles and all gear drive are features of a new line of *Rice* diaphragm pumps (2, 3 and 4-in. sizes) shown in this bulletin. (44)

TRACK SCALES. Modern heavy-duty *Howe Scale* units in 25 models (capacities from 60 to 200 tons per section) are shown in this catalog. (45)

FLUIDIZED FEEDER handles granular or powdered solids in dense phase through pipes in the same manner as liquid, this *Sawyer Bailey* brochure tells. (46)

MATERIALS HANDLING systems engineered by *Gifford-Wood* are illustrated in this 32-page bulletin, with details of the firm's bulk-test service. (47)

TANKS. Bolted steel and wood tanks for liquid storage, thickeners and the like are discussed in this 16-page *Denver Equipment* bulletin. (48)

WEIGHING the contents of tanks, hoppers, bins, etc. with the new SR-4 electronic system is outlined in an 8-page *Baldwin-Lima-Hamilton* report. (49)

VARIABLE RPM. Labelled the "miracle motor", the *U.S. Varidrive* provides variable speeds as low as 2 rpm and as high as 10,000, this colorful brochure says. Ratios of change up to 10:1 and ratings to 50 hp are furnished. (50)

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The HT4 Shovel shown here digs rock and loads and hauls buggies in a quarry at Kananaskis, Alberta, for Loder's Lime Co., Ltd. When both of the plant's kilns are working, this Cat Shovel handles 35 buggies a day. Plant capacity is 70 tons of lime per eight hours. The versatile HT4 can also bulldoze, clean up and do light stripping. It has excellent operator visibility, and is compact and maneuverable for work in tight places.

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Selection of an Air Compressor For a Crushed Stone Plant*

another P&Q exclusive

One of the frequent complaints regarding the operation and mechanical difficulties in a crushed stone plant is that the air compressor or other pneumatic equipment in the plant is too small, too large and cumbersome, or not operating properly. Many times the equipment is not in good operating condition. If this is the case, it cannot keep pace with the other integral units that make up the crushing plant; hence the whole system suffers, and output is not at full load.

How do you correct this situation? What steps are involved? How much air do you need for the new plant you are installing?

In most cases the source of the problem is found in the selection of the compressor at the time of the purchase of the plant, or the renewal of the compressor, or modernization of the plant. The answer lies in the proper selection of an air compressor when the plant is under way.

When management of a crushed stone operation purchases a new crushing unit, an air compressor is usually supplied as a part of the original equipment. The crusher manufacturer supplies the correct size of compressor to operate the pneumatic devices in the plant proper, but he does not usually furnish enough air capacity for the many other uses of compressed air which will be needed when the plant begins operation. Soon after the opening of the plant the owner will find that he can improve operation and reduce maintenance by daily air-cleaning of electric motors, conveyor and shaker screen shafts and bearings, and other important parts of the various units in the plant.

The natural and practical method of getting the required air at the place desired is to tap the air mains in the plant within that area. Thus, cleaning lines, greasing equipment lines, and others will be added. Eventually demands will exceed the capacity of the compressor, and none of the pneumatic equipment in the plant will operate with any degree of efficiency or usability. As time goes on, more and more uses of compressed air are installed without any additional air capacity. The result of these additions is a continual decrease in the operating pressure of the air system, and the pneumatic equipment designed to save labor, and therefore money, soon becomes costly and mechanically inferior.

The first recommendation is, therefore, to talk with the air compressor people as well as the crushing plant manufacturer when a new plant is under consideration. Such conferences should result in a plan of the air uses throughout the operation, inside and outside the plant, as well as a plan for meeting plant expansion, since compressor manufacturers have planned expansion systems. A unit (Figure 1), when applied concurrently with plant suggestions and plans, becomes a pattern to follow in the total expansion of the plant, without the expense of adding a full new compressor package to the existing setup. Such a system is a customary step in the operating and expansion plans of large industrial plants in many fields.

It will be highly valuable to look into some of the actual applications of compressed air for a crushed stone plant with the help of field representatives of compressor manufacturers.

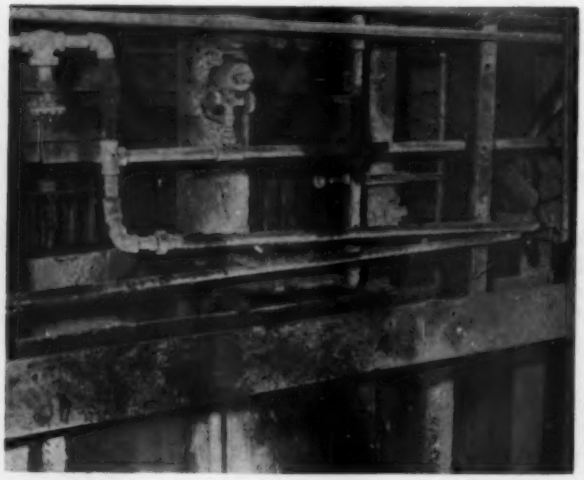
The most frequent application is the operation of pneumatic cylinders which open and close the gates of bins or hoppers in crushed stone or ready-mix concrete plants.

In some cases cylinders are applied

*Photos and data by courtesy of Compressed Air and Gas Institute.

Left: Fig. 1 — A typical unit air compressor system.

Below: Fig. 2 — A double-acting air cylinder, in which the piston is returned by air.



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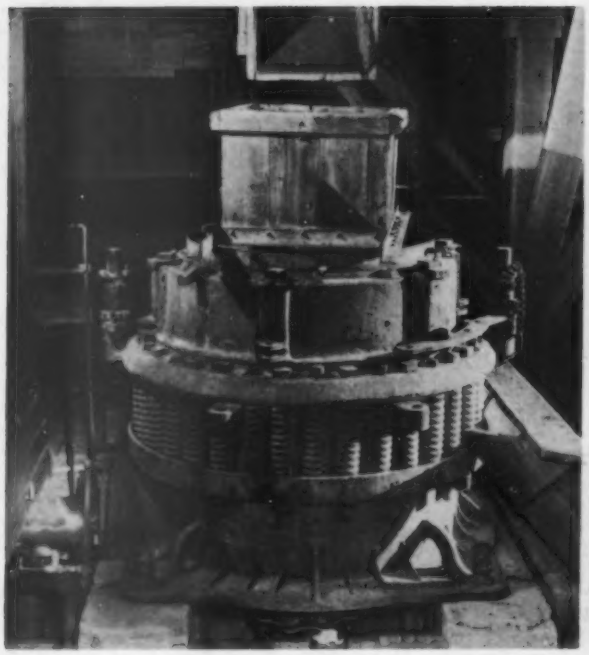

Fig. 3 — Compressed air acts as a seal and a coolant for the working parts of a cone crusher.

Fig. 4 — Compressed air directed at bearings from nozzles cleans and cools them.

to hoppers between the primary and secondary and tertiary crushers, as a means of controlling the flow of stone through the plant and maintaining smooth production without depending on surge piles. This method greatly reduces the possibility of jamming the secondary crusher by piling up stone from the primary too rapidly. The operator has control of the flow and can work hand in hand with the other crushers. The air consumption of these cylinders varies with the diameter of the piston of the cylinder, the length of the stroke, and the number of strokes per minute.

The following tables gives the air consumption, per inch of stroke, of the most popular sizes of cylinders, and also the force of push developed.

Consumption and Capacity of Air Cylinders

Cylinder Diameter (Inches)	Free Air Consumed per Inch Stroke at 80 lb. Pressure c.f.m.	Push with 80 lb. Pressure
2½	0.018 c.f.m.	490 lb.
3	0.026	706
3½	0.035	962
4	0.046	1256
4½	0.059	1590
5	0.072	1964
6	0.103	2827
8	0.185	5026
10	0.293	7854

Let us determine the air consumption of a 4-in. cylinder with a 6-in. stroke, making 100 operations per hour with air at 100 lb. gauge pressure. According to the table, a 4-in. cylinder consumes 0.046 c.f.m. per inch stroke, so the 6-in. stroke will consume 6 x .046 or 0.276 c.f.m. per stroke. 100 operations per hour is 1.66 operations per minute; so the total consumption will be 1.66 x .276 or 0.488 c.f.m. if the piston is returned by spring or gravity. If the piston is double-acting (returned by air), the consumption will be doubled or 0.896. All this is for 80-lb. operation; so if 100-lb. operation is desired, the air consumption will be about 20 percent greater, or 1.075 c.f.m. for a double-acting cylinder. Figure 2 shows a double-acting air cylinder.

An application of compressed air which is second in frequency of occurrence, but more important in plant operation, is the use of low-pressure compressed air as a seal and coolant in the secondary gyratory crushers. In this case, a unit like that shown in Figure 3, compressed air at low pressure is used to cool and seal off working parts from abrasive dust created by the crushing operation. This volume of air is about 12 to 15 c.f.m at 4 to 6 p.s.i. The pressure is controlled by means of a pressure regulator or a small globe valve. In the globe valve the pressure may have a tendency to vary slightly, but it can be regulated closely enough to maintain working pressures.

Of almost equal use, and certainly of equal importance is the use of compressed air under constant flow from small nozzles directed at the shaft bearings on shaker screens, and end shaft bearings on conveyor belt shafts. These four shaft bearings are exposed to a great amount of powdered stone from the shaking and sorting operation, and the small jet of air provides a method of cleaning and cooling the bearings. This operation saves time and labor, due to less down time and, therefore, less maintenance cost. This use of compressed air could well be installed in many plants; and it would be a beneficial addition, even where sealed bearings are used.

An example of this application is shown in Figure 4. The following table shows the relationship of compressed air requirement and nozzle size at average pressure of 15 p.s.i.

Compressed Air Requirement And Nozzle Size

Nozzle Size (Inches)	Air Consumed c.f.m. @ 15 p.s.i
1/16	1.80
1/8	7.8
3/16	10.2
1/4	23.6

A small nozzle is fine for this operation. The size recommended is 1/16-in. or the ⅛-in. hole drilled in a small pipe cap, and fitted into a street ell for directional control, fixed at the end of the pipe and thus directed at the bearing itself. It is surprising how much time and labor this little item will save. Two of

these nozzles should be directed at each bearing, one on each side, as shown in Figure 4.

The application consuming the most compressed air in a crushed stone plant is that of cleaning lines and blow lines. All open machinery in the plant should be periodically cleaned, weekly or more often, to remove the accumulation of abrasive stone dust. Electric motors, gasoline or diesel engines, belt drives, and motor controls all should be blown clean as often as possible to insure trouble-free operation and long life. Since this air is not normally used while the plant is in operation, it is well to consider this application as a separate item. The average plant can be well cleaned with lengths of 1/2-in. air hose, each fitted with a short 1/2-in. pipe ending in a small nozzle. For such cleaning operations, a 1/16-, 1/8-, or 3/16-in. nozzle can be used.

Too large a nozzle will consume far too much air; moreover, pressure and velocity do the cleaning, rather than volume. For instance, a ¼-in. nozzle will consume 104 c.f.m. at 100 p.s.i. This means a 25-hp. compressor, which would be far too large for the average plant. A 1/16-in. nozzle consumes 6.49 c.f.m. at 100 p.s.i.; a ⅛-in. nozzle consumes 26.0 c.f.m. at 100 p.s.i.; and a 3/16-in. nozzle consumes 59 c.f.m. at 100 p.s.i. All of these can be operated on the 15-hp. compressors at 80 to 100 p.s.i. This size of compressor is proper for most plants. The velocity of the air is the important factor on a cleaning line; and since the smaller nozzles allow higher pressure on the cleaning line, velocity is greater, cleaning will be faster, and more areas can be reached and cleaned more thoroughly.

In a few plants a small plug drill, about 20-lb. class, is used by the primary crusher operator in case an oversize stone passes through the entrance. This will cause stoppage of stone flow and tie up the entire plant, sometimes for an hour or more, while the stone is removed. If the operator can get at the stone, he drills a small hole in it, drives the feathers in, and splits the stone, which can then pass through the crusher.

Where it is too dangerous to allow the operator to use a plug drill, due to proximity to the crusher, it is advisable to have a small air hoist available on an overhead rail. A hook can be dropped from the rail to raise the stone and allow it to be turned, so that a smaller part of it

(*Continued on page* 108)

● 13 TON OWEN

The stresses and strains to which especially large machines are subjected are more than proportionally greater than machines of conventional size. Proper designing challenges the knowledge and skill of the engineer.

An interesting example of skillful designing and sound construction is this 5 Cu. Yd. Owen Bucket built to handle dredging of large blasted rock.

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Can Your Company Guarantee Wages?

Will the guaranteed annual wage offer employee security—or will it mean bankruptcy for your enterprise?

YOUR management soon will be hearing a lot about wage guarantees. Before going into the subject, the executives of a firm should know definitely what it covers, when the issue will come to a head, and how it will be solved.

The guaranteed annual wage scheme is not new, but today it is a very lively issue in our free American enterprise system, which undoubtedly is unsurpassed the world over.

By R. D. STEVENS, LL.B., LL.D.
Management Consultant

Wage guarantees may appeal to workers, but what about management? Should it be forced to pay idle workers? The trend seems to indicate that wage guarantees will be a big issue in 1954 for most employers. Let us look at some striking facts which management should relay to employees.

First of all, workers should be told that nobody can guarantee wages any more than profits. Wages, like profits, must be earned; both come from good management.

Next, employees should be made aware of the fact that profits are used for various purposes—for example, to pay dividends to owners of private enterprises, to increase credit standing, to expand and modernize present facilities or acquire new ones, to buy new machinery and equipment, to pay for product and customer research, to expand present markets, to protect business in hard times, and to create more and steadier jobs.

Management should also tell labor that buyers decide the sale of products; that the law of supply and demand enters into the production picture; that competition plays a vital role in economic life; and that taxes eat up a large portion of profits.

Producers of cement, crushed stone, gypsum, lime, sand, gravel, and other nonmetallic minerals, like employers in other fields, must put aside a fund to continue operations and to supply future jobs.

However, for obvious reasons, the operator should make an investigation of the whole problem of wage guarantees. He should examine the specific experiences other employers have had with guaranteed wages. He should conduct an analysis of the methods and possibilities of regularizing production and stabilizing employment. He should inquire about the cost of various types of wage guarantees. He should make an analysis of the economic effects of guaranteed wages, that is, in regard to the prices at which the buyer is willing to buy his products. He should also ask employees exactly what is meant by "guaranteed wages".

Among the many wage guarantee schemes are the Hormel, Nunn-Bush, and Procter & Gamble plans, which differ materially in form and substance.

The possible costliness, benefits, and other quantitative economic effects of wage guarantees depend very much upon the type adopted. At present there are apparently three main kinds of private arrangements called guaranteed wage plans. The following discussions of these plans should not be construed as expressing approval of any of the particular details embodied in these examples. They are merely presented for evaluation in case your management is confronted with a given problem. In any event, *legal counsel should be sought in the negotiation of the so-called guaranteed wage plans.*

Plan I—For each calendar or fiscal year the company agrees in a legally or morally binding fashion to provide some number of weeks, say 45, of full-time pay (or its equivalent spread over the year) to a specified group of workers, selected by seniority or length of previous service. The contract or agreement may or may not be renewed for the following year, and its coverage and hours of guarantee may be altered, provided that notice to that effect is given at least three months prior to the end of the contract year.

In this plan, if your company encountered a sudden slump very early in the year, it might be obliged to incur the costs of maintaining income for a period of almost a year. On the other hand, if the decline in its sales came late in the year, your company might be able to reduce its payroll in very short order. The firm would run the risk of having to maintain, on the average, substantial wage payments for something like six months after a decline in its revenues.

Plan II—This is the same as Plan I except that the contract or agreement does not run from the beginning of one fiscal year to the beginning of the next. Instead, the guarantee runs on indefinitely—until the company gives 12 months' notice of its intention to discontinue the guarantee or change the extent of its coverage. One might also imagine a plan identical to example II except that the period of termination notice is reduced to, say 6 months.

Plan III—This could be like either of the above two plans, but with the extra limitation that the employer's wage liability to workers laid off should never exceed in any year, say, 10 percent of the guaranteed wage payroll. In most years this would in fact provide 100 percent income security to all workers; but in a very bad year, when the number of idle workers became very high, the employer's liability would have an upper limit. In this event, the laid-off workers would have to share in some manner the amount available for wage payments within the limitation of the 10 percent liability.

Obviously all sorts of modifications and limitations could be attached to each of these illustrations. Because business cycles have numerous causes and cannot be entirely eliminated, and there is no evidence that recessions can be prevented by government spending, it stands to reason that exaggerated claims and overstating the importance and so-called advantages of guaranteed wages can do more harm than good.

Under our present system of free American enterprise, a system which helped to develop this country and one that really works, it is extremely doubtful that any one enterprise is secure enough or powerful enough to withstand and modify the great swings of general business activity.

From an over-all appraisal of the efficacy of the guaranteed wage program advocated by labor today, the device would appear to be, by itself, a weak reed upon which to rely in combatting unemployment. More the reason why it is a substitute for our national system of unemployment in-

surance, in which the bill is footed by the employer.

It would be shocking if wage guarantees were forced upon employers as a result of government legislation or through collective-bargaining pressure. Moreover, it would be extremely disturbing to all employers to be forced to pay idle workers, particularly since there are unavoidable cessations of business activity.

There is real danger in the guaranteed wage because it might increase monopoly and government control, or both. In addition, more and more the burden of its cost would then be shifted forward to the consumer through higher prices. If wage guarantees are forced upon businessmen at the expense of profits and interest on investment to enterprise, incentive to investment could be destroyed.

This is a question labor should answer: *Does it want jobs or does it demand wage guarantees?* In strongly organized industries, employers may have to work out some plan for wage guarantees through collective bargaining. Eventually, however, more and more employers will have to solve this problem.

To sum up, *a guaranteed wage program,* emphatically, *will not guarantee every worker a continuous job.* Those who advocate wage guarantees do not attempt to explain how the plan will be financed. However, it has been reported that a guaranteed wage plan might be acceptable and pay for itself under the pay-as-you-go plan, similar to the pension plans now in effect throughout industry. That is, it might be a contributory one. In effect, the employee might pay say 2 percent of his monthly salary, and the employer might match the contribution, in order to build up a reserve fund for the payment of compensation when business is slow. But the amount of guaranteed wages that could be financed from depression business profits and surplus would be quite limited. Under the pay-as-you-go plan, the employer and employee might contribute equal amounts in the boom years to cover the risk involved.

Production and profits make markets, and markets make jobs, and so on, indefinitely. There is no "magical operation" in this theory, just plain facts.

Here are some questions management should answer. Would wage guarantees tend to cause employers to hire fewer workers? Would it not tend to retard new investment and business expansion? What will wage guarantees finally do to individual incentive? Will it cause business to stagnate? What effect will wage guarantees have upon prices and costs? Obviously, the guaranteed wage plan would raise the risk of doing business. After all, it does seem just common sense that if an employer is to keep his employees actually and profitably employed, there must be reasonable production and profits.

At present there is no sufficient factual proof that the guaranteed annual wage is the answer for unemployment in a dynamic economy such as ours. Once employment is guaranteed by wages, what will happen when the guarantee is over?

It can be clearly seen that the small business enterprise is going to find itself in a precarious situation if it is forced to guarantee wages at labor's demand. Taken as a package, this program might well end in bankruptcy and no security for the workingman.

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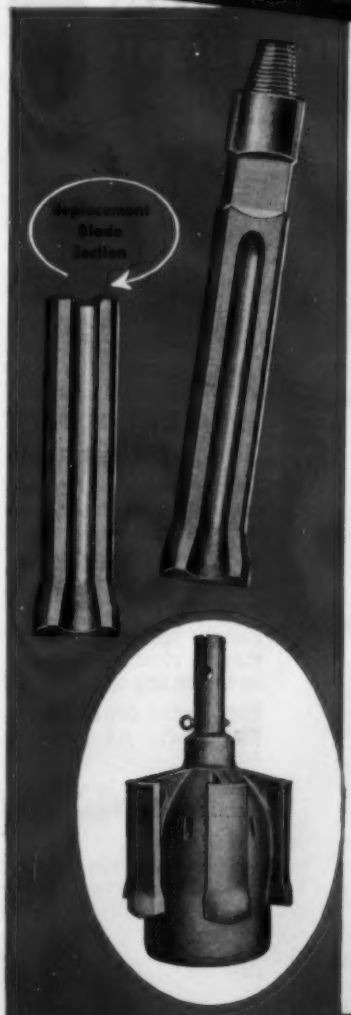

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In view of the fact that American industry does suffer rather widespread fluctuations in business activity through no fault of the employer, wage guarantees must be considered only with safeguards; and because of the extensive financial costs, they should, therefore, not be indiscriminately applied.

Can your company guarantee wages? Should it do so? How can it be done? Of course, if your collective-bargaining contract contains a provision for this plan, your management can feel its impact. Hence, your management must consider the purely economic aspects of the guaranteed wage plan if it wants to stay in business.

The problem becomes interesting and important only if your own firm is faced with it. Wage guarantees may be submitted to your company at any time.

Air Compressor Selection

(*From page* 105)

will enter the crusher and thus break the rest of the stone to allow entry into the jaws or cone of the crusher. A one-ton, or two-ton hoist is sufficient. These hoists will consume up to 90 c.f.m.

Where a feeder is used in conjunction with the primary crusher for controlled feed, it is possible to use either the plug drill method for large stones, or a small paving breaker, in the 35-lb. or 60-lb. class, using moil points, narrow chisels, or saber points to break the stone into two or more smaller ones. The feeder type installation is a good one; it pays dividends in less down time due to blockage of the crusher from overloading. The air-cleaning principle should be applied to the shafts and bearings of the feeder also to insure trouble-free operation.

The accompanying table lists the air consumption of several sizes of the tools mentioned above at average air pressure of 80 p.s.i.

Air Consumption of Various Tools

Tool	C.F.M.
B-35 paving breaker	35
B-60 paving breaker	55
D-20 rockdrill	30
D-45 rockdrill	80
1- or 2-ton air hoist	up to 90

Listed below are some of the many additional applications of compressed air in a crushing plant.

Useful Stone Plant Air Equipment

Tool	C.F.M.
Drill steel cutters	92
Steel sharpeners	30 (light) 90 (medium)
Furnaces-bits, steels	22
Rock bit grinder	90
Riveters (¾" capacity)	25
Chipping hammer	20-30
Scaling (heavy-duty)	15
Grinders (6" wheel)	30
Impact wrenches (¾" drive)	30
Sump pumps (dependent on head to be pumped	90 and up

There are, of course, many other special uses for compressed air in the crushing plant. The best way to take advantage of them is to be sure of the requirement, and the application to the point of use from the air consumption standpoint. To be sure of the proper layout of the compressed air system and the right size of air tools and cylinders, call in a field engineer for a survey of your plant. Compressed air manufacturers will gladly go over such a report, making recommendations as to how the system can be made more profitable. An engineer's survey should cover the overall condition of the plant and suggest applications of the existing air compressor facilities that will prove more profitable. Remember that the air which operates the tools and devices is free. When other types of tools are operated, there is a power cost for each tool.

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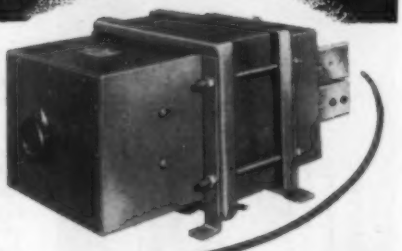

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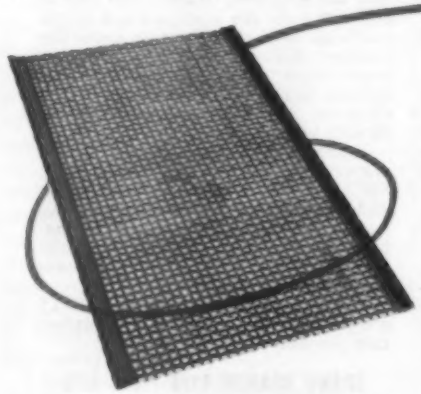

Available in five different assemblies. HANCO engineers have designed and constructed electrical screen heaters to fit YOUR make of screen. Note: Reduction in openings can be effected to meet ever changing specifications.

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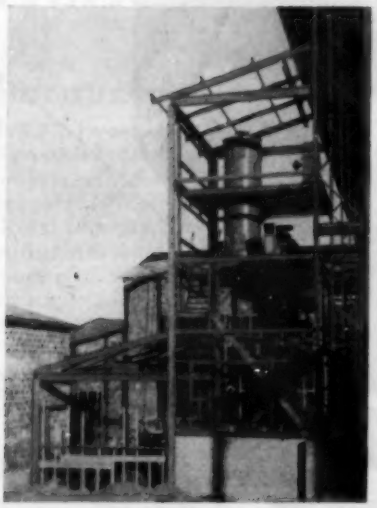
Agstone for Newfoundland Farming Supplied by North Star Cement, Ltd.

Material pumped 3,500 feet to packing plant



North Star's agstone plant during construction. This plant has a capacity of 35,000 tons per year. It represents the only source of supply of agstone for Newfoundland.

IN 1950 the Provincial Government of Newfoundland embarked on a major program for developing its manufacturing, fishing, agriculture, trade, and related industries. Plans for expanding agricultural production called for a local source of supply of agricultural limestone. In view of this fact, when the government built a new 600,000-bbl. cement plant at Corner Brook (on the island's west coast) in 1951, it also added a special department for the manufacture of agricultural limestone up to a capacity of 35,000 tons per year. Subsequently the combined cement-agstone plant (as originally planned) was sold to private interests—Company North Star Cement, Ltd.*

At the present time the North Star plant represents the only source of agstone for Newfoundland. It supplies a total of about 5,000 tons per year to the farming industry, which is localized among several isolated farming districts particularly in the southern half of the island. The remainder is exported principally to Prince Edward Island. The agstone readily meets the government specifications of 100 percent passing 10-mesh and 70 percent passing 100-mesh. Higher fineness is not required in the country because, according to practical experience, a higher fineness does not produce a greater fertilizing effect.

This relatively low agstone requirement largely reflects the limited amount of agriculture carried on in Newfoundland. Most of the agricultural activity consists of mixed farming and dairy farming, although there is minor production of vegetables, beef cattle, and poultry. The annual use of fertilizers other than agricultural limestone amounts to about 6,000 tons at present.

Due to the unique geographical factors governing the North Star plant location, the plant features both an unusual plant layout and materials-handling setup. The plant is actually split into two distinct units, including the cement-agstone manufacturing department, located on a plateau about 320 ft. above sea level at a distance of 3,500 ft. from the port of Humbermouth, and the storage-packing department located at Humbermouth. The two units are connected by pipelines which transfer finished cement, agstone, water and oil, and electric power. This method of conveying dry agstone *via* pipe is somewhat unusual to the industry, and therefore will be described in detail later.

The peculiar arrangement of North Star's physical plant was necessitated by a desire to secure space large enough to accommodate the necessary buildings and roads, to permit future expansion of the cement plant, and to be as close as possible to the raw material deposit, and also to the harbor, where the packing plant could be established.

Raw material for the production of agricultural limestone is obtained from a quarry about ¾ mile from the plant. A different section of this same quarry supplies high-calcium limestone for cement manufacturing. The material used for agstone is dolomitic, the added magnesium carbonate content of about 10 percent making it highly desirable for soil fertilizing purposes but not for cement manufacturing.

In the quarrying operation a Bucyrus-Erie diesel-powered 1½-cu. yd. shovel is used for loading. Haulage is handled by three combination Caterpillar DW-10 tractors and Athey 11.4-cu. yd. side-dump wagons. Overburden removal and road maintenance are accomplished with a Caterpillar D6 bulldozer. Five Flothmann jackhammers, operated in conjunction with a Flothmann 210 c.f.m. compressor, are used in drilling; holes average 1¾ in. in size.

At the primary crushing station, which is also used by the cement plant, quarried material is dumped into a 30-ton steel hopper and then conveyed by a 55-in. by 34-ft. inclined apron conveyor into a double-shaft Titan 56- by 70-in. hammermill. The hammer shafts, revolving at 300

The unique North Star plant layout necessitates the use of a 3,500 ft. pipeline (illustrated here) to transfer bulk cement and agstone from the manufacturing departments to the dock-site packing plant.

*The cement plant was described in detail in the March, 1954, issue of PIT AND QUARRY, Vol. 46, No. 9, pp. 91-96.

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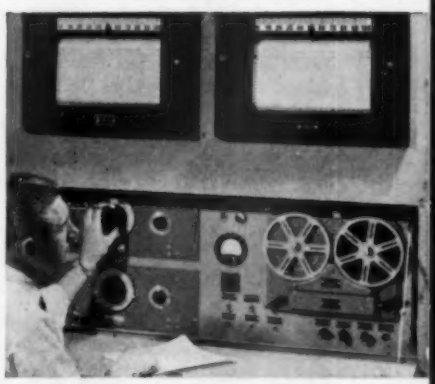

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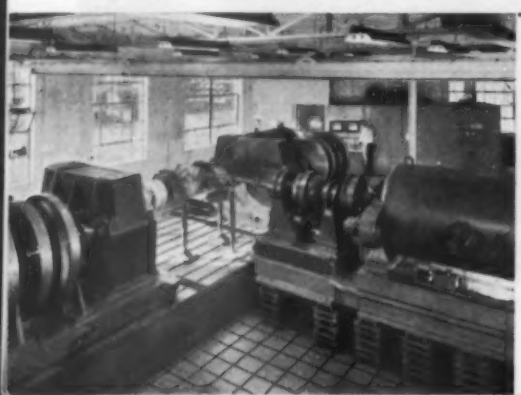

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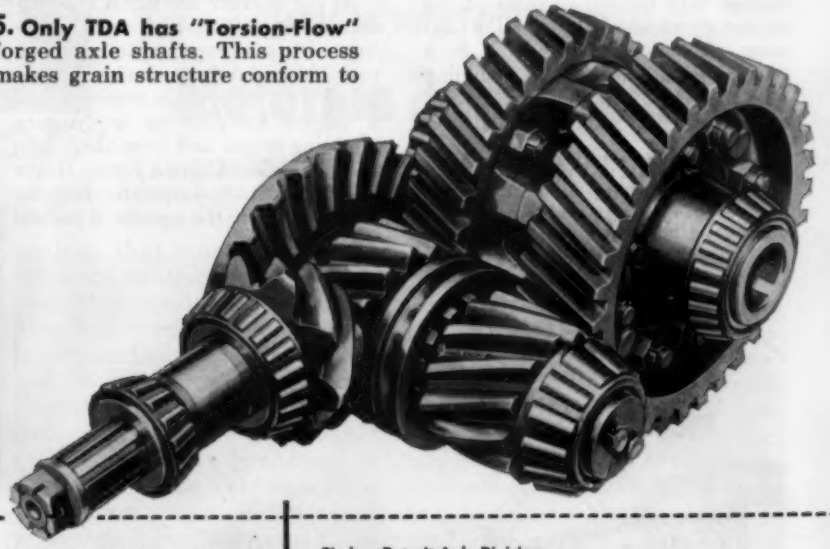

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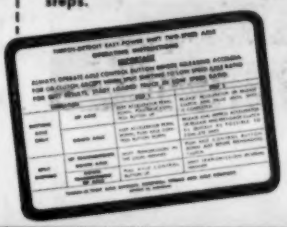

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Minus ⅝-in. material from the primary crusher being discharged into a bin at the storage building; from the bin it is fed to the agstone plant.

r.p.m., are each equipped with 12 manganese steel hammers weighing 200 lb. each. The primary crusher, driven by two 160-hp. slip-ring a.-c. motors through V-belts, has a capacity of 80 t.p.h. The crushed material, minus ⅝ in. in size, is then conveyed by an inclined bucket elevator to the covered storage building in front of the agstone plant. The material is fed by a 9-ton travelling bridge crane equipped with a 3½-cu. yd. bucket, into two 70-cu. yd. feeding bins located in front of the secondary crushing units. The agstone plant is accommodated in a 26- by 26-ft. steel frame building 42½ ft. high, which is constructed of red brick tile and corrugated steel sheeting.

Secondary crushing is handled by two impact mills which have a 24- by 31-in. intake opening. Each is powered by a 21-hp., a.-c. motor and operates at a speed of 1,450 r.p.m. Grinding capacity of each mill is 5 t.p.h. The ground material is conveyed by a vertical bucket elevator to an air separator driven by a 15½-hp. motor. The coarse material is returned into the storage area for recircuiting, and the fine material goes into the feeding bin above a Fuller-Kinyon pump. The pump, which is powered by a 61-hp. a.-c. motor, has a conveying capacity of 10 t.p.h. The required air is supplied by a Balcke rotary compressor driven by a 190-hp. slip-ring a.-c. motor operating at a speed of 580 r.p.m. and having a capacity of 940 c.f.m. at 65 p.s.i.

The Fuller-Kinyon pump air-conveys the fine material through a 6-in. pipeline into the storage silo on the shore at Humbermouth at a distance of 3,500 ft. Approximately one-half the length of the unusually long agstone-conveying pipeline is placed on concrete piers just above the ground, and the other half is on steel supports. The flow of the agstone is downgrade with a difference in level of 220 ft. It was anticipated that some trouble would develop in operating this pipeline, but practical experience has proven its operation to be excellent.

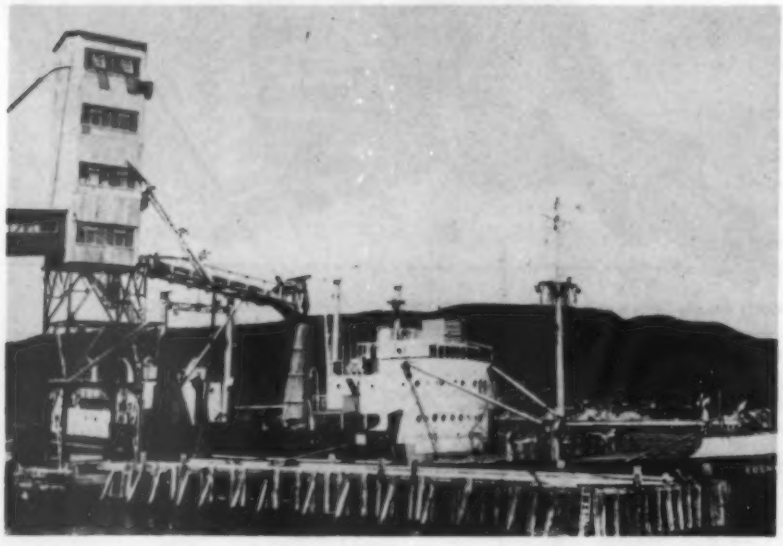
At the docksite the silo is a 20-ft.-diameter by 46-ft.-high steel structure with a storage capacity of 550 tons. Material from storage is conveyed *via* a drag chain conveyor and a bucket elevator to a Niagara vibrating screen and from there into the feeding bin above a 2-tube Haver & Boecker fully-automatic bagging machine. Here the agstone is packed in 3-ply paper bags containing 100 lb. each.

The agstone can also be transferred by a two-way pipe to either a truck and railcar loading bin or to a feeding bin served by a Fuller-Kinyon pump, which transfers the material to ships. In either case the agstone is automatically weighed on self-recording band scales before being discharged into the respective bins. Various stations of the agstone-loading equipment are dedusted through a 4½-ft.-dia. by 15-ft.-long bag-type dust collector.

For loading ships, two 26-in. by 265-ft. belt conveyors are used. (The same facilities accommodate cement loading.) The conveyors are installed in a covered steel frame structure bridge which terminates in an all-steel 95-ft. tower at the wharf.

A belt conveyor bridge 10 ft. wide and 40 ft. long, arranged for lifting and lowering, has two gangways, one on each side, and two built-in belt conveyors. These conveyors terminate in two unique swinging telescope-type spiral chutes which convey the bagged cement and agstone into the ship's hatches. For loading bulk cement and agstone into ships the following equipment is provided: a 6-in. Fuller-Kinyon pump driven by a 156-hp. a.-c. motor; a rotary compressor of 2,650 c.f.m. at 35 p.s.i., driven by a 156-hp. a.-c. motor, installed at the packing plant; a cyclone collector, and a bag-type collector installed in the highest part of the tower, both discharging the cement and agstone over cellular wheels through a 9-in. pipe into the boat.

A special ship-loading device is used to load bagged cement and agstone into ocean-going freighters.



The domestic sulphur industry produced 465,360 long tons of native sulphur and 31,000 tons of recovered sulphur (of a purity of 97 percent or greater) during the month of May, according to reports of producers to the U. S. Bureau of Mines. The total produced in April, 1954, was 445,158 tons; and for May, 1953, the corresponding figure was 455,380 tons. Producers' stocks of native sulphur increased slightly over the previous month and at the end of May stood at 3,192,607 tons.

United States Gypsum Company officials report net earnings for the three months ended March 31 of $6,524,398, equal to $3.99 a share Net earnings for the same period in 1953 amounted to $4,853,634, or $2.95 a share. Sales totaled $46,818,-043, topping the 1953 figure of $45,037,000.

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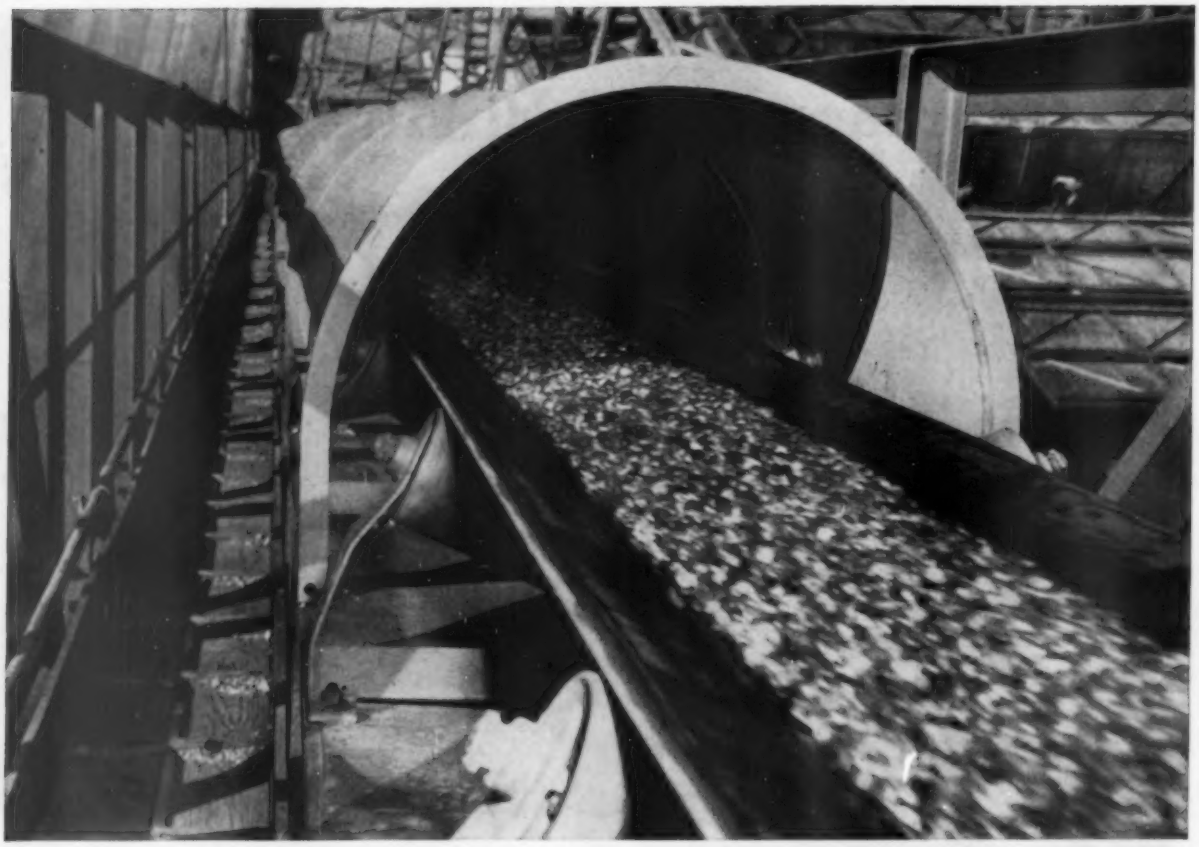

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Crushed rock being loaded on belt underground. This 24-inch belt, reinforced with "Cordura" rayon, hugs the center idler for better training and troughing throughout its 310-foot run.

Steady production at the Basalt Rock Company, Fontana, Calif., which makes concrete pipe, depends on the performance of the conveyor belt shown above. The belt, reinforced with Du Pont Cordura* High Tenacity Rayon, is used continuously for 6 hours each day . . . and running conditions include exposure to the heat of summer, and to winter sand and dust storms.

The company reports that this "Cordura" reinforced belt, manufactured by the Manhattan Rubber Division of Raybestos-Manhattan, Inc., has given highly satisfactory service under all operating conditions since its installation 9 months ago. It has carried an average daily load of 1500 tons of rock and sand—has needed no repair or maintenance to date.

The extra strength of Du Pont "Cordura" permits a belt that's thinner, yet stronger. And the *low stretch* of "Cordura" reduces expensive downtime for take-up and resplicing.

Write us for names of suppliers . . . and send for your free *copy of the new booklet "Mine & Quarry Facts About 'Cordura'." Address: Textile Fibers Department, Room 11504Q, E. I. du Pont de Nemours & Co. (Inc.), Wilmington, Del.*

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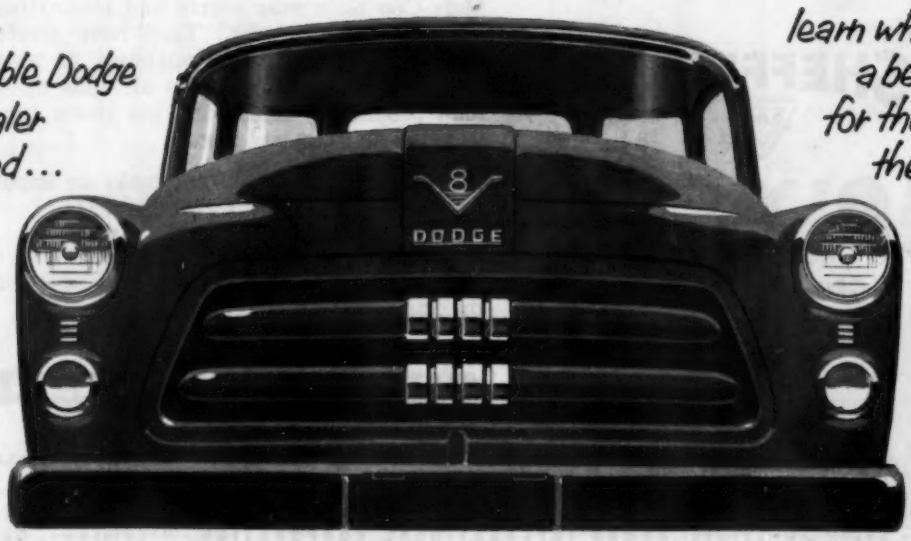

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Closed-Circuit or Open-Circuit Grinding?

Part II

By H. BÖRNER*

Grinding Diagrams

The grinding work done in the individual compartments is tested by the well known method of taking samples at intervals of 1 m. (39.37 in.). In the diagrams, Fig. 6 and Fig. 7, the left side shows the residue on the 60-micron sieve, and the right side the corresponding specific surface (Blaine).

The grinding path in the closed circuit made it necessary to divide the diagram Fig. 7. The output, A, from the second compartment passes to the air-separator, S, and the tailings, G, are fed to the third compartment. Since the scoops at this inlet are not emptied completely, the diagram also shows the false circulating load, G'. This backwash, amounting to 11,000 lb./hr., affects the calculation of the main circulating load based on screen analyses.

The use of cubes in the second compartment of the compartment mill caused an increase in surface, but the grindability had also been higher for samples 8 and 9, as shown by the sieve analysis. In the closed-circuited mill, however, the use of Cylpebs in the second compartment was not much better than Concavex.

A comparison of the discharge from the second compartment with samples 6 and 9 of approximately the same grindability, shows that about 500-700 sq. cm. less surface was produced. Samples 6 and 4, on the other hand, are equally good at 4,000 Blaine. But the compartment mill produced only 77 bbl./hr.; the closed-circuited mill 106 bbl./hr.

Table 5 contains a tabulation of the grinding diagrams. This shows even more clearly how the grinding done in the first and second compartments depends on the specific surfaces of the discharge, which are also a measure of the grindability. At a Blaine value of 500 at the end of the first compartment of the compartment mill, more than twice as much surface has been created as at a value of 240. This shows that a direct comparison of the two mills cannot be made based on the grinding diagram, and at the same time that the higher specific surfaces of the open circuit have no relation to strength. Knowledge of the relations between sieve analyses, specific surfaces, and strengths is therefore necessary to control the operation.

*Translated by J. Walter, Emmisa, Paris, France, and C. F. Clausen, Chicago, from an article in the August, 1952, issue of *Zement-Kalk-Gips*.

Screen Analysis and Specific Surface (Blaine)

All specific surfaces were measured with the Blaine apparatus, corrected according to Arnell's and Svenson's findings, since there is no agreement as to how to calculate the influence of particle size and shape on the average pore-diameter[1]. Based on various electron microscope and gas adsorption investigations, it seems that Arnell's correction factors are more nearly correct. These correction factors are still somewhat unexplored and should be used with caution in order not to confuse further the picture of grinding finenesses.

Fig. 8 shows specific surface in relation to sieve residue. The compartment mill shows a considerable spread, which increases with the use of cubes in the second compartment. The median lines indicate that for the same specific surface (Blaine), the closed-circuit cement contains 2 percent residue on a 60-micron sieve. The diagram also indicates that the

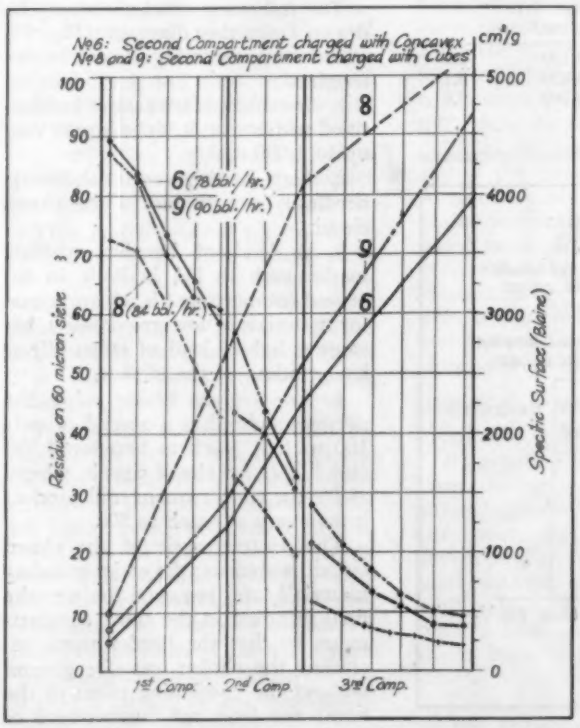


Fig. 6: Grinding diagram for 7-ft. 9-in. by 43-ft. compartment mill.

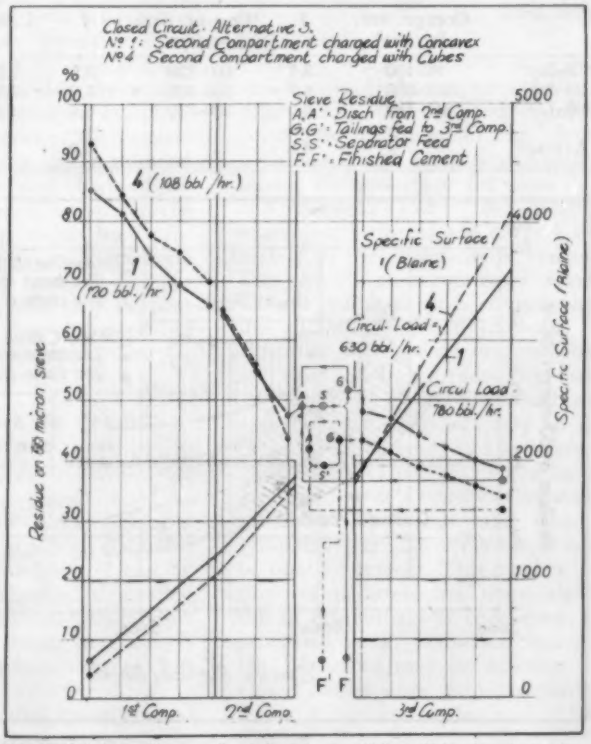

Closed Circuit · Alternative 3.
№1: Second Compartment charged with Concavex
№4 Second Compartment charged with Cubes
Sieve Residue
A, A' = Disch. from 2nd Comp.
G, G' = Tailings fed to 3rd Comp.
S, S' = Separator Feed
F, F' = Finished Cement
4 (108 bbl./hr.)
1 (120 bbl./hr.)
Specific Surface / (Blaine)
Circul. Load 630 bbl./hr.
Circul. Load 780 bbl./hr.
Residue on 60 micron sieve
Specific Surface (Blaine)
1st Comp.
2nd Comp.
3rd Comp.

Fig. 7: Grinding diagram for 7-ft. 9-in. by 43-ft. mill in closed circuit.

TABLE 5
Compartment Mill vs. Closed Circuit
Surface Area (Blaine) produced in each Compartment From Grinding Diagrams

	Compartment Mill			Closed Circuit	
Grinding Diagram No.	6	8	9	1	4
Date	20-10-51	29-11-51	16-1-52	13-21-51	16-1-52
Feed	13 t/h	14 t/h	15 t/h	20 t/h	18 t/h
Surface Area (Blaine) 1st compartment	240	500	350	320	200
Surface Area (Blaine)	1,230	2,600	1,440	1,200	1,030
Produced cm²/g	990	2,100	1,090	880	830
2nd compartment	Concavex	Cubes		Concavex	Cylpebs
Surface Area	2,280	3,900	2,600	1,860	1,800
Produced cm²/g	1,050	1,160	1,160	660	770
3rd compartment					
Surface area	4,000	5,200	4,750	3,600	4,080
Produced cm²/g	1,720	1,300	2,150	1,740	2,280
Total					
Produced cm²/g	3,760	4,700	4,400	3,280	3,880

laws for straight clinker grinding do not apply to a heterogeneous material.

Surface area determinations, however, are only of value when considered together with the relation between surface area and strength.

Strength Index

For simplification of comparison it is highly important to use strength indexes, a combination of flexural and compressive strength. Kühl[8] proposed in 1929 to use the sums of the 3-, 7-, and 28-day compressive strengths and 10 times the tensile strengths. After the adoption of the new standard in 1940, Grün and Obenauer[9] determined after 330 tests that the factor for flexural strength would be 5.1 with portland cement and 4.1 with slag cement. Anselm[10] used the same factors for his comparisons of strength. Since slag cement is competing with portland cement in strength, it is natural to use the smaller factor in calculating the strength-indexes. Slag cement's initial higher ratio of flexural and compressive strength is later reversed, while the increase in compressive strength of portland cement is delayed by only one time interval. Normal ratios are in any case reached after 90 days with a factor of 5, as for portland cement. This is confirmed by a tabulation of all strength results obtained with the Watenstedt slag cements.

The three-day strength index is of special interest in connection with slag cement, and is calculated as:

$W_{3d} = 5 \times \text{Flex.}_{3d} + \text{Compr.}_{3d}$

for all comparisons below the 28-day index:

$W_{28d} = 5 \times \text{Flex.} + \text{Comp.}$ for $3 + 7 + 28$ days

TABLE 6
Ratio f, between Compressive and Flexural Strength

	Low Strength		Average Strength		High Strength	
	Compr. Str. kg/cm²	f	Compr. Str. kg/cm²	f	Compr. Str. kg/cm²	f
3-day	80-100	3.1	100-120	3.5	120-130	3.9
28-day	320-350	4.7	350-380	5.0	380-420	5.1
90-day	460-480	6.0	500-520	6.6	540-560	6.6
Average		4.6		5.0		5.2

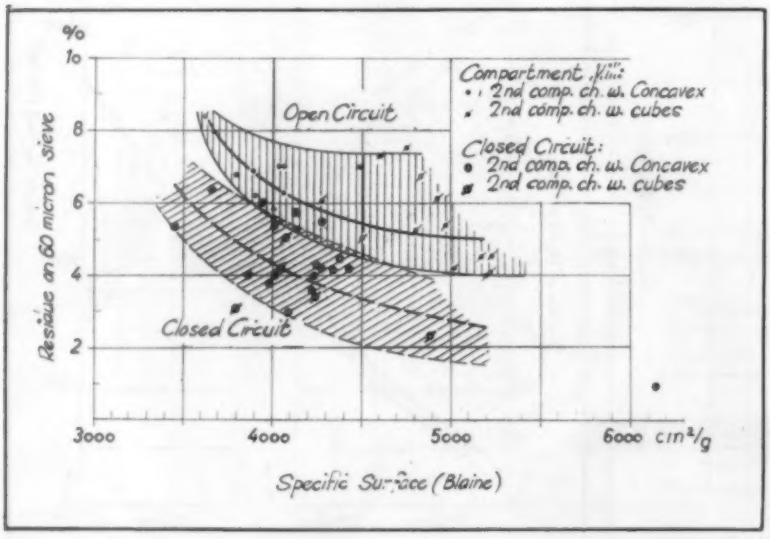


Fig. 8: Residue on 60-micron sieve vs. specific surface (Blaine).

Strength Index and Surface Area

Fig. 9 shows the ratio between the strength indexes and the observed specific surfaces (Blaine). The average curves 1 and 2 represent the two grinding periods for the compartment mill; the average curve 3, the closed-circuit grinding. The spread of observations for the three-day index shows how the surface area varies with the grindability of the slag. Example: for the same 28-day strength-index of 1,400 kg./cm², the compartment mill's surface area (Blaine) will, according to the grindability, vary between 5,050 and 4,500 (Concavex)or between 5,050 and 4,000 (Cubes); for the closed circuit the varition is only between 4,600 and 4,200.

The following conclusions may be drawn from this diagram (Fig. 9), when the grindability cannot be determined:

1. Specific surface cannot be identified with strength, since it may vary up to 1,000 cm²/g.

2. Slag of high grindability is needlessly overground in the closed circuit.

3. A load of heavier grinding media, such as 1¼ in.-balls, in the second compartment is advantageous for materials of low grindability, because a lighter load of cubes effects less grinding of the clinker.

4. For a given Blaine value, the strength index has a spread of only 100 to 150, (such as between 1,350 and 1,500) for closed circuit, whereas for the compartment mill product it may vary as much as 300.

This characteristic of the closed circuit is obvious; the easier-grinding materials are removed before the final grinding in the third compartment, so that the harder parts, including the clinker, may be ground without the cushioning effect of the fines; the fines are furthermore of less hydraulic value.

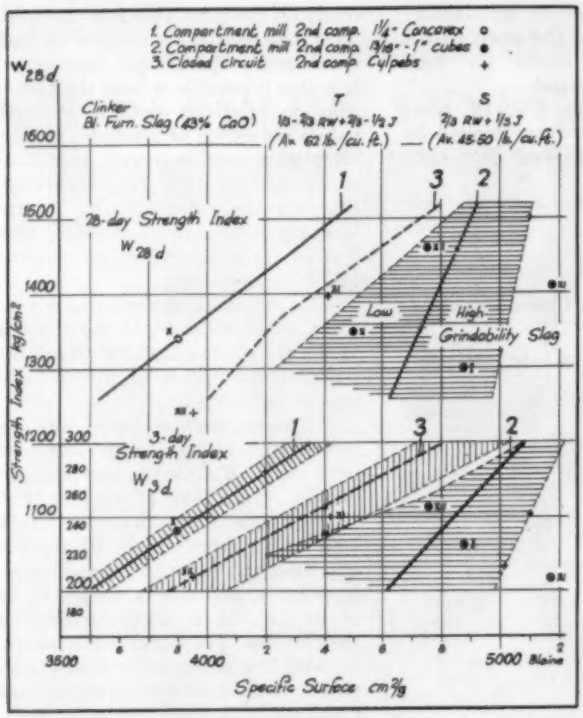


Fig. 9: Open vs. closed circuit. Strength index vs. specific surface (Blaine) at constant clinker content.

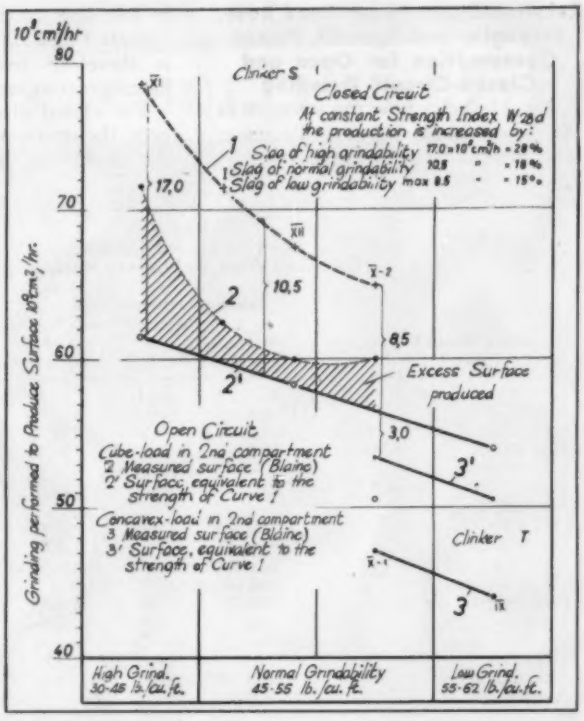

Clinker S
Closed Circuit
At constant Strength Index W 28 d
the production is increased by:
Slag of high grindability 17.0 = 10⁶ cm³/h = 28 %
Slag of normal grindability 10.5 = 18 %
Slag of low grindability max 8.5 = 15 %
17.0
10.5
8.5
Excess Surface produced
Open Circuit
Cube-load in 2nd compartment
2 Measured surface (Blaine)
2' Surface, equivalent to the strength of Curve 1
3,0
Concavex-load in 2nd compartment
3 Measured surface (Blaine)
3' Surface, equivalent to the strength of Curve 1
Clinker T
Grinding performed to Produce Surface 10⁶ cm²/hr.
High Grind. 30-45 lb./cu. ft.
Normal Grindability 45-55 lb./cu. ft.
Low Grind. 55-62 lb./cu. ft.

Fig. 10: Open vs. closed circuit. Grinding work to produce surface/hr., by grinding periods.

For closed-circuit grinding of slag cement this "selective" grinding is of considerable advantage and permits, as it were, the use of the Blaine surface area as a measure of strength. For open circuit, however, the sieve analysis but not the Blaine surface may provide only a certain indication, if any, of the strength. The mill cannot be adjusted to the various grindabilities, and must be operated at its lowest output consistent with safe strength index. (Even the "electric ear" is of no help since it is a question of fine grinding of the part containing less clinker.)

This is the reason why a comparison of the grinding in both mills cannot be based on the surface produced, but rather on the "Strength-Equivalent Surface", which will be indicated by the closed-circuit curve 3 in Fig. 9 for a given strength index.

The grindability is indicated by the average curve. It is insignificant that the grindability curves for open-circuit run somewhat parallel to the left border of the observation field 2.

Relation of all surface areas to curve 3 is justified; grinding tests with clinker S and slag-mixtures corresponding to curve 1 produced values of the order of curve 3. Curve 3 represents, therefore, the borderline of field 2 for slag of low grindability (62 lb./cu. ft. and higher).

The considerable spread of the Blaine surfaces for the compartment mill in open circuit which runs parallel to the grindability of the slag components cannot be explained by the various surface characteristics, density, and porosity of the slag. Contraction of the field 2 upon the curve would give a "form-factor" of 2 for the 62 lb./cu. ft. slag and 1.5 for the 31 lb./cu. ft. slag. As expected, however, microscopic examinations show the opposite: the particle shape of the heavier slag is rounded and of the lighter slag sharp-edged. A special calibration curve for the Blaine instrument, as has been proposed in the Laboratory Publication of the Associated German Cement Manufacturers, would only be possible for limited slag characteristics and less practical for open- than for closed-circuit cement.

Grinding Work to Produce Surface

If grinding work regardless of "form-factor" is based on the strength-producing surface created per hour, the grinding diagrams shown in Fig. 6 and Fig. 7 can be used without difficulty, if dealing with a feed of normal grindability. Such a feed, as shown in Table 7, might have a surface area of 240 cm.²/g.

Table 7 shows that the cube-load in the second compartment of the open-circuit mill created 5 percent new surface (with clinker S only, not with the harder-grinding clinker T), whereas the closed-circuit mill created 20 percent new strength producing surface. As shown in the bottom lines, this increase of capacity was produced in the third compartment.

The grinding diagrams show test results only. Daily average operating data during the observed grinding period are illustrated in Fig. 10.

Curves 2 and 3 represent the observed Blaine-surface for open circuit; curves 2′ and 3′ the strength-equivalent surfaces; and curve 1 the surface of the closed-circuit cement. The shaded area represents excess surface produced. It is obvious that the additional surface produced in closed circuit depends on grindability. Slags of high grindability show an increase of 17 unit-areas=28 percent; of medium grindability an increase of 18 percent; and low-grindability slags 15 percent. For a hard-grinding slag of a density of approximately 62 lb./cu. ft. and with a grindability similar to clinker, it may be only 12 percent. This reaches the limit of homogeneous materials as far as grindability is concerned; in other words, a production increase of 12 percent may be expected in closed circuit when grinding clinker S to a specific surface of 4,000 (Blaine).

Relationship between Feed Rate, Strength, and Specific Power Consumption for Open and Closed-Circuit Grinding

Fig. 11 shows how the strength of the open-circuit cement decreases with increasing feed rate, particularly for slag of highest grindability (points I and XI). The open circuit is therefore less suited for such heterogeneous materials.

For closed circuit, Fig. 12, however, the strength indexes depend on the circulating load and only indirectly on the grindability of the feed. This influence of the circulating load is of great operational advantage; it makes it possible to base the operation on relatively definite strength values regardless of grindability. The circulating load is merely kept constant and the feed rate regulated; this was easily done at the Watenstedt plant through a one-switch control of three band-feeders adjusted for the desired mix.

This regulation necessitated a relatively exact measure of the amount of the circulating load for which the power consumption of the elevator was found suitable.

The calibration curve was determined by filling the elevator cups with weighed amounts and measuring the return load at point b (Fig. 13). It turned out that the return load was approximately 10 percent less than the amount in the scoops at point a, and that a stream of 48 to 60 bbl./hr. is short-circuited in the elevator. The curve was confirmed with a watt recorder during normal operation. Calculation of the circulating load based on sieve analyses was attempted, but gave too low values; separator feed and tailings were increased approximately 12 bbl./hr. by the dust returned from the collector, by approximately 48-55 bbl./hr. by the short-circuited

TABLE 7
Open vs. Closed Circuit Grinding Work to Produce Surface

Grinding Diagram No. / Feed	Compartment Mill 6 78 t/h	Compartment Mill 8 84 t/h	Compartment Mill 9 90 t/h	Closed Circuit 1 120 t/h	Closed Circuit 4 108 t/h
1st comp. 10^9 cm²/h	12.9	29.4	16.4	17.6	14.9
2nd — —	Concav.	Cubes	Cubes	Concav.	Cylpebs
	13.7	18.2	17.4	13.2	13.8
3rd — —	22.4	18.2	32.2	34.8	41.0
Total 10^9 cm²/h	49.0	65.8	66.0	65.6	70.0
Strength Index					
W 3d	250	200	210	170	205
W 28d	1,400	1,350	1,300	1,120	1,235
Acc. to Fig. 9 ☞ Curve 3	Based on Strength—Equivalent Surfaces and normal grindability				
End Product cm²/g	4,380	4,200	4,100	3,700	3,940
Feed —	240	240	240	240	240
Produced —	4,140	3,960	3,900	3,460	3,700
Grinding Work 10^9 cm²/h	53.8	55.5	58.5	69.0	66.6
Average —	54.0	57		68	
1st compartment	13.0 — 24%	13.0 — 23%		13.0 — 19%	
2nd —	14.0 — 26%	17.0 — 30%		14.0 — 21%	
3rd —	27.0 — 50%	27.0 — 47%		41.0 — 60%	
Total	54.0 —100%	57.0 —100%		68.0 —100%	

Refer to Fig. 6 and Fig. 7 (Grinding Diagrams) and Table 5.

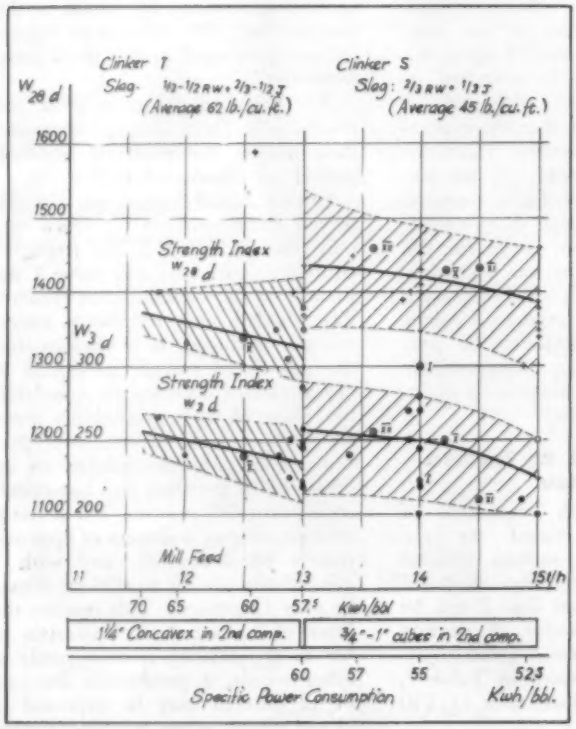


Fig. 11: Compartment mill, open circuit. Feed, strength-indexes, and specific power consumption.

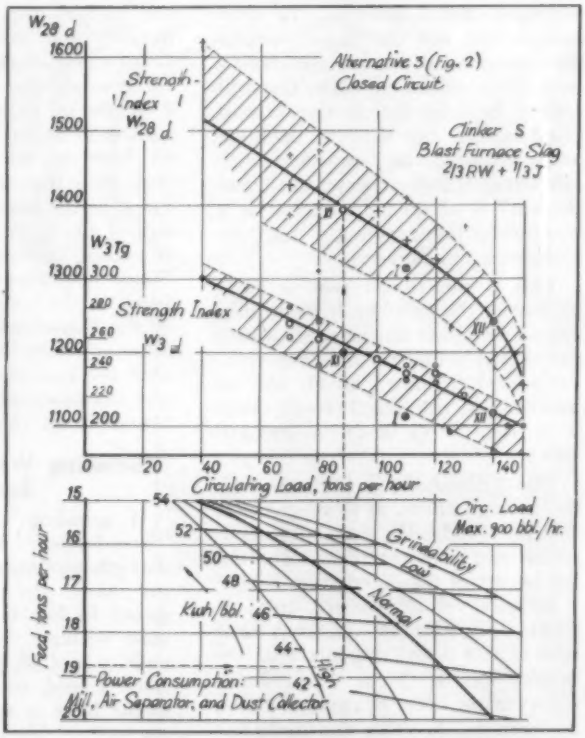
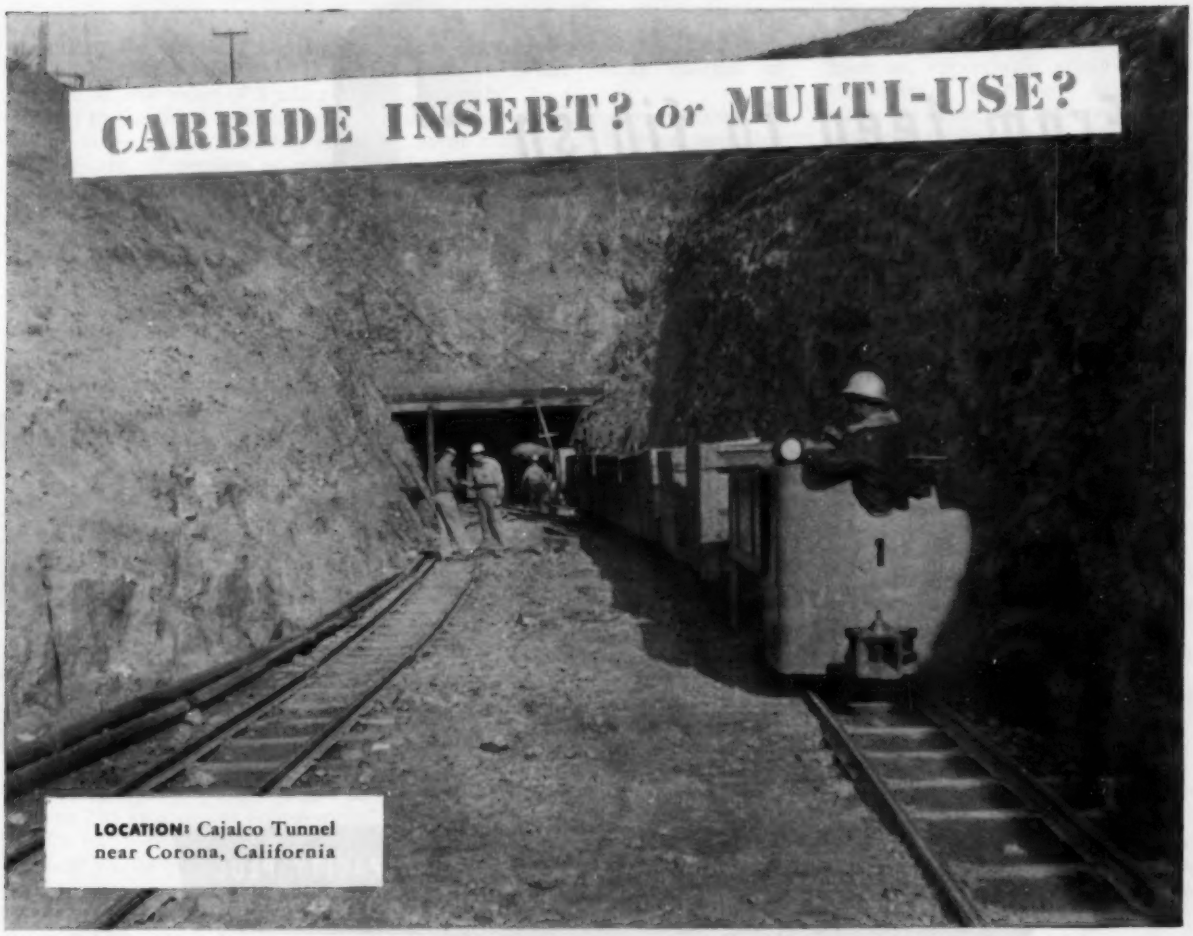


Fig. 12: Mill in closed circuit. Feed, circulating load, strength indexes, and specific power consumption.



"Our experience with TIMKEN® carbide insert bits on Big Cliff Dam job sold us on using them for Cajalco Tunnel", *says The Shea Company*

WORKING on a diversion tunnel at the Big Cliff Dam project in Oregon, The Shea Company found that Timken® carbide insert bits did the job best. So, when it came time to start the Cajalco Tunnel, W. F. Rennebohn, General Manager, The Shea Company, again chose Timken carbide insert bits.

For hard and abrasive ground, Timken carbide insert bits are the best answer for highest speed. They're also most economical for constant-gage holes, small diameter blast holes and very deep holes.

But they're *not* the best solution to *all* your drilling problems.

For ordinary ground, Timken multi-use bits are most economical. With correct and controlled reconditioning, they'll give the lowest cost per foot of hole when full increments of steel can be drilled.

Both Timken carbide insert and multi-use bits are interchangeable in the same thread series. A wide range of different Timken bits fit the same drill steel. As the ground changes, you can change bits quickly, easily—right on the job.

For the best bit type for *your* particular drilling requirements, call on the Timken Rock Bit Engineering Service. Write The Timken Roller Bearing Company, Rock Bit Division, Canton 6, Ohio. Cable address: "TIMROSCO".

Timken threaded multi-use rock bit

Timken threaded carbide insert rock bit

... your best bet for the best bit ... for every job

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

From feed to finish in less than 3 seconds

Patent Pending

CONTROLLED IMPACT ACTION

UNIVERSAL IMPACT MASTER GIVES YOU TOP CAPACITY PLUS UNIFORM GRADATION CUBICAL AGGREGATE IN ONE FAST OPERATION

Controlled Feeding

Shovel loaded run-of-quarry rock is directed into the path of the rotor hammers to receive the smashing impact of a direct blow.

Controlled Breaking

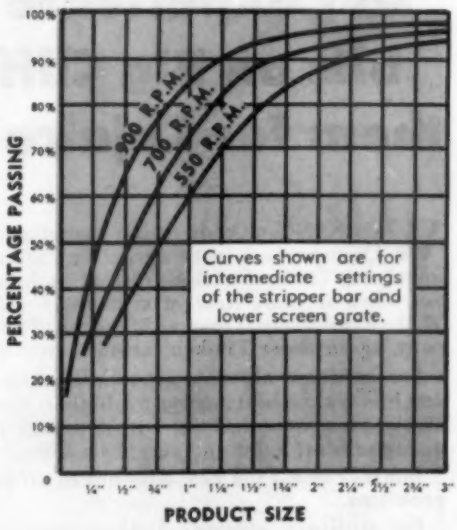
All of the breaking is accomplished by the impact of rotor hammers upon the rock resulting in a cubical product of highest quality. Both rotors rotate in the same direction *with the flow of material* promoting fast feeding and fast discharge for top capacity. Incoming rock is struck a solid blow by the first rotor and finish size is instantly discharged. Oversize particles are struck by the second rotor and finish size is again quickly discharged.

Control over Finished Product

Three simple mechanical adjustments provide complete control over finished product. Size is governed by rotor speed. Various positions of stripper bar and lower screen grate give a wide degree of control over gradation. In closed circuit setups recirculating loads can be kept to a minimum.

● *Ask for Literature.* Get the complete story on the UNIVERSAL IMPACT MASTER. Learn how its high speed production of highest quality uniform gradation cubical aggregate can earn greater profits for you. Models available for both portable and stationary setups with capacities to 750 tons per hour. Full details in Bulletin No. U534.

PERFORMANCE MODEL 3240



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stream in the elevator, and by approximately 18-30 bbl./hr. by the leakage at the point of feeding the tailings to the third compartment.

The air-separator efficiency is approximately 40 percent at medium circulating loads. A sharper separation might well be had with materials of high grindability, but would tend to create too uniform particle size.

In the few grinding trials run according to Alt. 1 (Fig. 2) where the tailings are finish-ground in open circuit, the reduced strengths were due to a too high separator efficiency (70 percent). This alternative could, however, be made fully as good as alternative 3 by adjusting the air-separator, and has already produced interesting 3-day strengths.

Comparison of the Two Systems

Fig. 14 shows a direct comparison of the two grinding systems as regards specific power consumption in relation to feed rate and to the obtained strengths, respectively. Using a slag component of normal grindability, the compartment mill in open circuit will, f.i., produce 84 bbl./hr. of cement with a 3-day strength-index of 250 at a power consumption of 9.2 kw.-h./bbl.; in closed circuit the mill would produce 100 bbl./hr. of the same cement at a power consumption of 8 kw.-h./bbl., and even with a wider safety margin of strength.

The strength shown by compartment mill curve 2 drops noticably over 84 bbl./hr. (at 9.2 kw.-h./bbl.), indicating this to be the production limit.

3-Day Strengths Obtained with the Two Systems

The drawback of the blast-furnace-cement is its low 3-day strength. Fig. 15 shows, however, that closed-circuit cement is better in this respect than open-circuit cement. The bend of the closed-circuit curves 1 and 1′ between strength indexes 1,200 and 1,300, and between 1,300 and 1,400, respectively, shows that the 3-day strengths do not necessarily follow the drop in the 28-day strengths, such as for open circuit.

The closed-circuit curve 1′, and points X for the open circuit show also that there is no difference in 3-day strength when using slag of low grindability.

Particle Size Gradation of Open- and Closed-Circuit Cements

Now, how is the particle size distribution? The sieve analysis covers only the coarse, and the surface-area determination only the fine end of the curve, although the particles between 3 microns and 30 microns have an appreciable effect on the character of the cement. Size gradation has therefore repeatedly been discussed in the technical literature, but not until two years ago did Gründer[4] and Wührer[12] publish the results of two experimental studies of size distribution and strength. A series of fineness analyses have now been made in the central laboratories at Watenstedt, using the well known Walther laboratory separator, as also employed by Wührer. Partly overlapping fractions were produced and the limiting sizes measured microscopically. Separation down to 3 microns was successfully accomplished.

As examples of these laboratory separation tests, Fig. 16 shows some distribution curves for various slags. They show cumulative weights in percent by 1-micron intervals in semilog scale. The observed surface areas (Blaine), strength indexes, and feed rates are indicated.

The same 28-day strength indexes are obtained for the two top curves with easy grinding slag although the open-circuit cement has its maximum at 3 microns with a little over 5 percent by weight and 800 cm.² more surface area (Blaine) than the closed-circuit cement; the maximum of the latter is 6 microns with a little

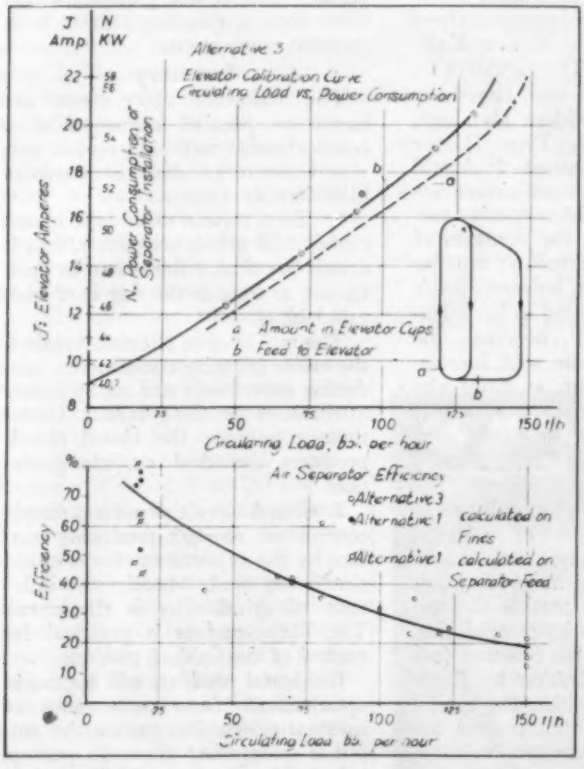

Fig. 13: Closed circuit. Elevator calibration curve—air separator efficiency.

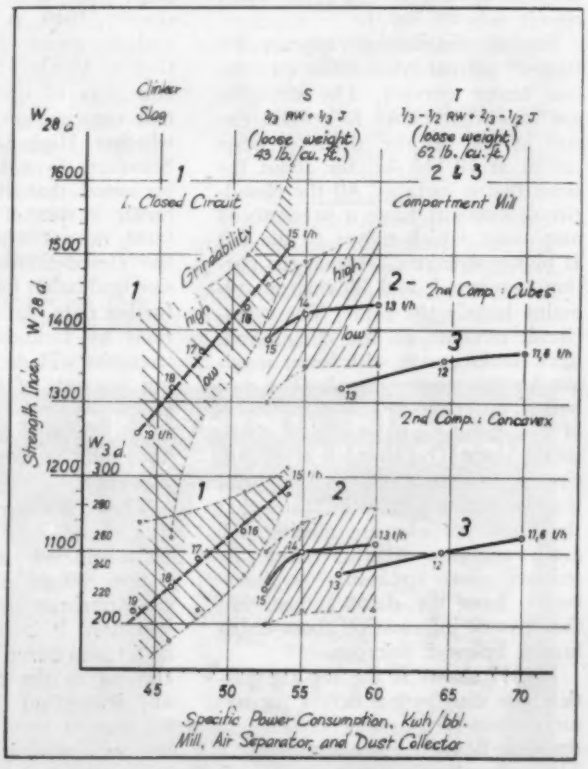

Fig. 14: Closed circuit vs. compartment mill. Specific power consumption—strength indexes.

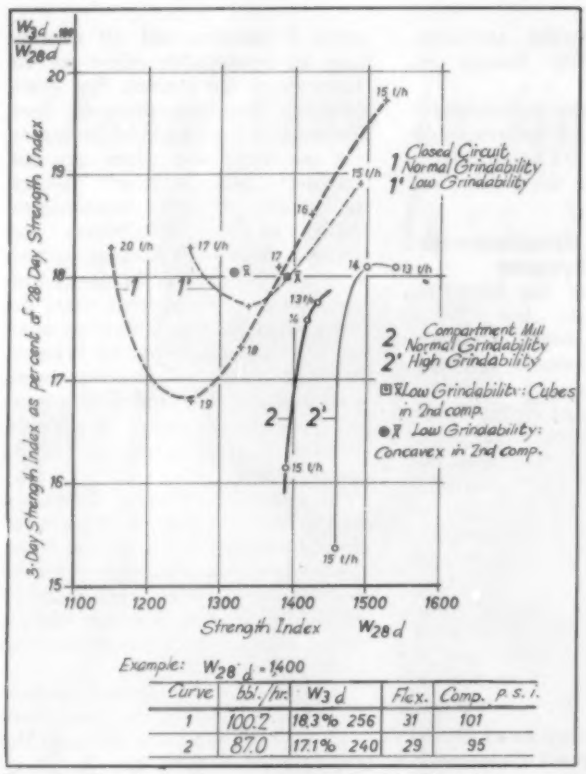
3-Day Strength Index as percent of 28-Day Strength Index
Strength Index W28d
1 Closed Circuit Normal Grindability
1' Low Grindability
2 Compartment Mill Normal Grindability
2' High Grindability
Low Grindability: Cubes in 2nd comp.
Low Grindability: Concavex in 2nd comp.
Example: W28d = 1400
Curve | bbl./hr. | W3d | Flex. | Comp. p.s.i.
1 | 100.2 | 18.3% 256 | 31 | 101
2 | 87.0 | 17.1% 240 | 29 | 95

Fig. 15: Closed circuit vs. compartment mill. Three-day strength index as percent of 28-day strength index.

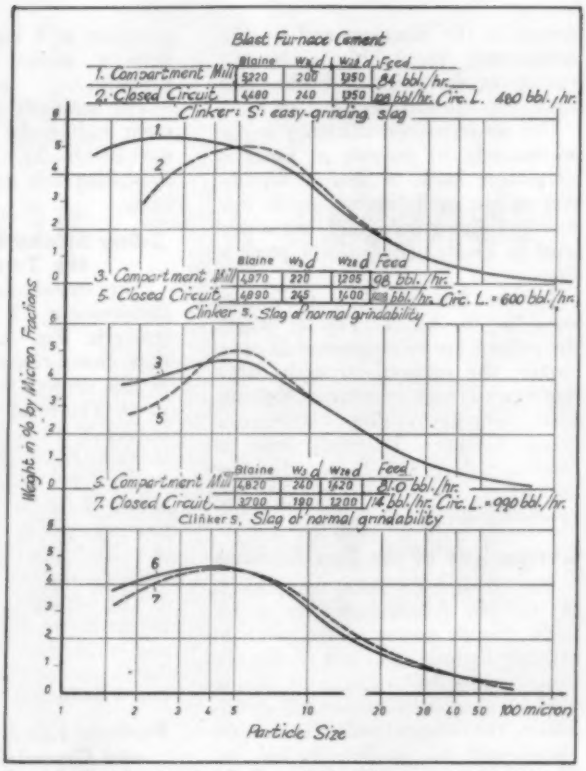
Blast Furnace Cement
1. Compartment Mill 5220 200 3250 84 bbl./hr.
2. Closed Circuit 4480 240 3250 108 bbl./hr. Circ. L. 460 bbl./hr.
Clinker: S: easy-grinding slag
3. Compartment Mill 4970 220 1295 68 bbl./hr.
5. Closed Circuit 4890 245 1400 108 bbl./hr. Circ. L. = 600 bbl./hr.
Clinker S. Slag of normal grindability
5. Compartment Mill 4820 240 1420 21.0 bbl./hr.
7. Closed Circuit 3700 190 1200 114 bbl./hr. Circ. L. = 990 bbl./hr.
Clinker S. Slag of normal grindability
Weight in % by Micron Fractions
Particle Size

Fig. 16: Particle size distribution of blast furnace cement made in compartment mill or in closed circuit.

under 5 percent by weight. The closed-circuit mill reached a production of 108 bbl./hr., the open circuit only 84 bbl./hr.

Similar distribution appears for slags of normal grindability (see the two center curves). The strengths are somewhat better for closed circuit at 108 bbl./hr. than for open circuit at 78 bbl./hr. for about the same Blaine surfaces. All the closed-circuit cements have a pronounced maximum, which moves to the left at higher strengths, whereas the portion between 5 and 20 microns remains largely the same. The open-circuit cements, on the other hand, have flatter curves with lower maxima for the same strength. The two bottom curves cover slag components of low grindability and high circulating loads. The strength of closed-circuit cement drops sharply, and the low Blaine surface indicates that the finest particles are missing. All grain analyses, whether made by sedimentation apparatus or flourmeter, have the disadvantage that they give no information about distribution below 2 microns.

Fig. 17 shows at the top the particle size distribution curves for two more blast-furnace-slag cements of the same Blaine-surface and strength. The general type of the curves is clearly indicated.

The lower part shows, for comparison, two American portland cement types, described in *Rock Products*[13], 1949, as Andreasen-analyses and also mentioned in *Zement-Kalk-Gips* by Anselm[14]. The various characteristics of open- and closed-circuit cements are evident also here, whether High-Early Type III or Standard Type I cement. It should be noted that the open-circuit cements, in spite of higher specific surfaces, do not reach the strengths of the closed-circuit cements; conclusive evaluation must, however, await further data. According to investigations by Gründer[4], however, the strengths will decrease with increasing amounts of flour, as Kühl also stated 20 years ago. The relatively steep left portion of the curve may also indicate excessive air-separator efficiency.

These few examples only show that closed-circuit cement need not be considered inferior just because it does not parallel the open-circuit characteristics as to particle size distribution. It is also immaterial that its fineness curve is not constant (according to the definition by Rosin and Rammler). Besides, the special features of open-circuit cement are not expressed in strength-building, because variations in grindability are reflected in the particle size distribution, for slag as well as for clinker. This feature is more obvious in blast-furnace cement, and presents, at the same time, a grinding pattern with extreme components.

Summary

The following observations are based on parallel operation of a compartment mill in open- and closed-circuit grinding of portland blast-furnace cement:

1. To a certain extent the closed circuit mill grinds selectively, *i.e.*, it grinds the clinker finer than in open circuit, as long as the slag is of high grindability.

The mill in open circuit overgrinds the easier grinding components, producing superfluous surface by higher attrition of grinding media. Under these conditions the closed circuit produces the ideal particle gradation.

2. Closed circuit permits a simple control of strength-producing surface by the adjustment of a constant circulating load, whereby the influence of grindability is eliminated. The Blaine-surface is practical for control of the finished product.

Incidental products will appear in open circuit from components of unequal grindability, unless the output is maintained 10 to 15 percent below the optimum. Blaine-surface is no measure of strength.

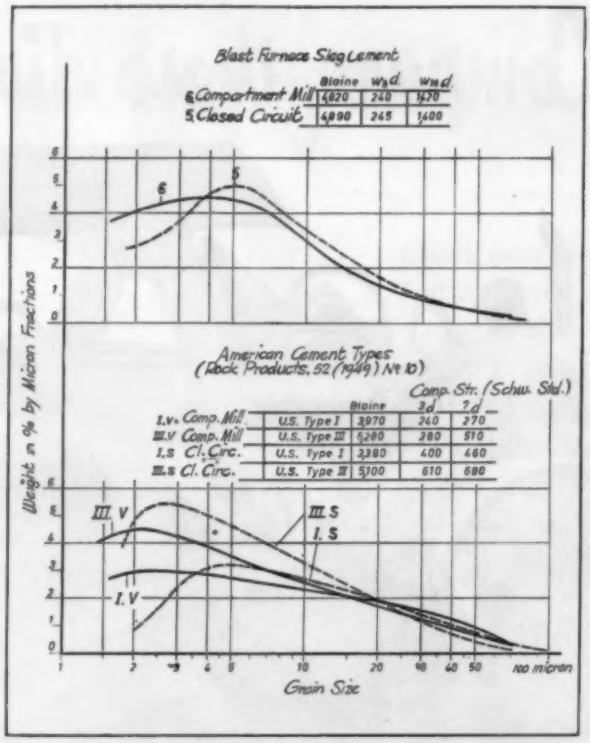
Blast Furnace Slag Cement
Blaine
6 Compartment Mill 4020
5 Closed Circuit 4090
American Cement Types
(Rock Products, 52 (1949) № 10)
Comp. Str. (Schw. Std.)
Blaine
I.V Comp. Mill U.S. Type I 3970
III.V Comp. Mill U.S. Type III 5200
I.S Cl. Circ. U.S. Type I 3380
III.S Cl. Circ. U.S. Type III 5700
Weight in % by Micron Fractions
Grain Size
no micron

Fig. 17: Typical particle size distribution curves for blast furnace slag cement and American cement types.

3. The output does not depend so closely on optimum load-filling in closed as in open circuit.

4. For the same strengths of the finished cement, the output in closed circuit is 30 percent higher than in open circuit with high-grindability slag; with normal slag 18 percent; and with low grindability slag (same as clinker) probably 12 percent. This applies to surface areas of 4,000 (Blaine) and higher. The increases in output were even obtained under load conditions which were not optimal for closed circuit.

5. The grinding temperature is 175 deg. F. to 195 deg. F. for currently used finenesses produced in closed circuit. The Americans furthermore cool the air separator so as not to exceed 140 deg. F. In open circuit, the cement will reach a temperature of 250 deg. F. to 265 deg. F. at the end of the third compartment. The use of rock gypsum alone is, therefore, not possible.

6. Among the five basic flow sheets—apart from the described alternative 3—the following are most promising: Alt. 1, embodying post-grinding of the tailings with low-grindability slags, and Alt. 5 with separate grinding of clinker and slag.

However, the last mentioned may not be expected to exceed Alt. 1 or Alt. 3 as much as would separate grinding in a compartment mill; the closed circuit is fundamentally closer to selective grinding.

The present knowledge of open- and closed-circuit grinding may be stated as follows:

"The more different the grindability of the components being ground (the harder and heavier being the most valuable), the higher the economic value of the closed circuit. Conversely, the superiority of closed circuit is less, the more homogeneous the materials, and the lower the grindability. The additional cost of equipment is, under German conditions, justifiable only for surface areas over 4,000 (Blaine).

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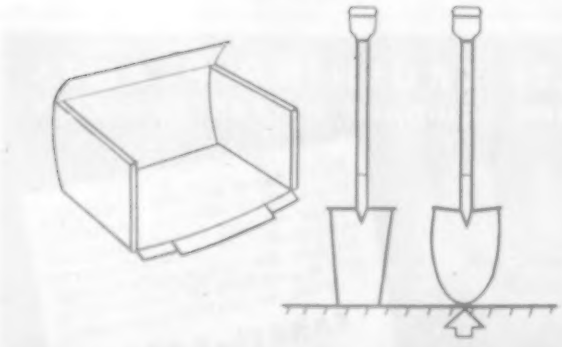
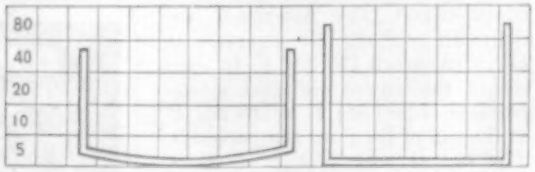
Curved and offset cutting edge on Allis-Chalmers Motor Scrapers concentrates all the horsepower on the center section during initial penetration. The penetrating ability of a round-end spade helps illustrate the practical soundness of this Allis-Chalmers design.

LOADS FASTER

Low, wide bowl plays an extremely important part in ease of loading. Tests have proved that loading resistance is largely determined by the height to which the load is built. New dirt entering the bowl must lift the load directly above it in order to make room for itself.

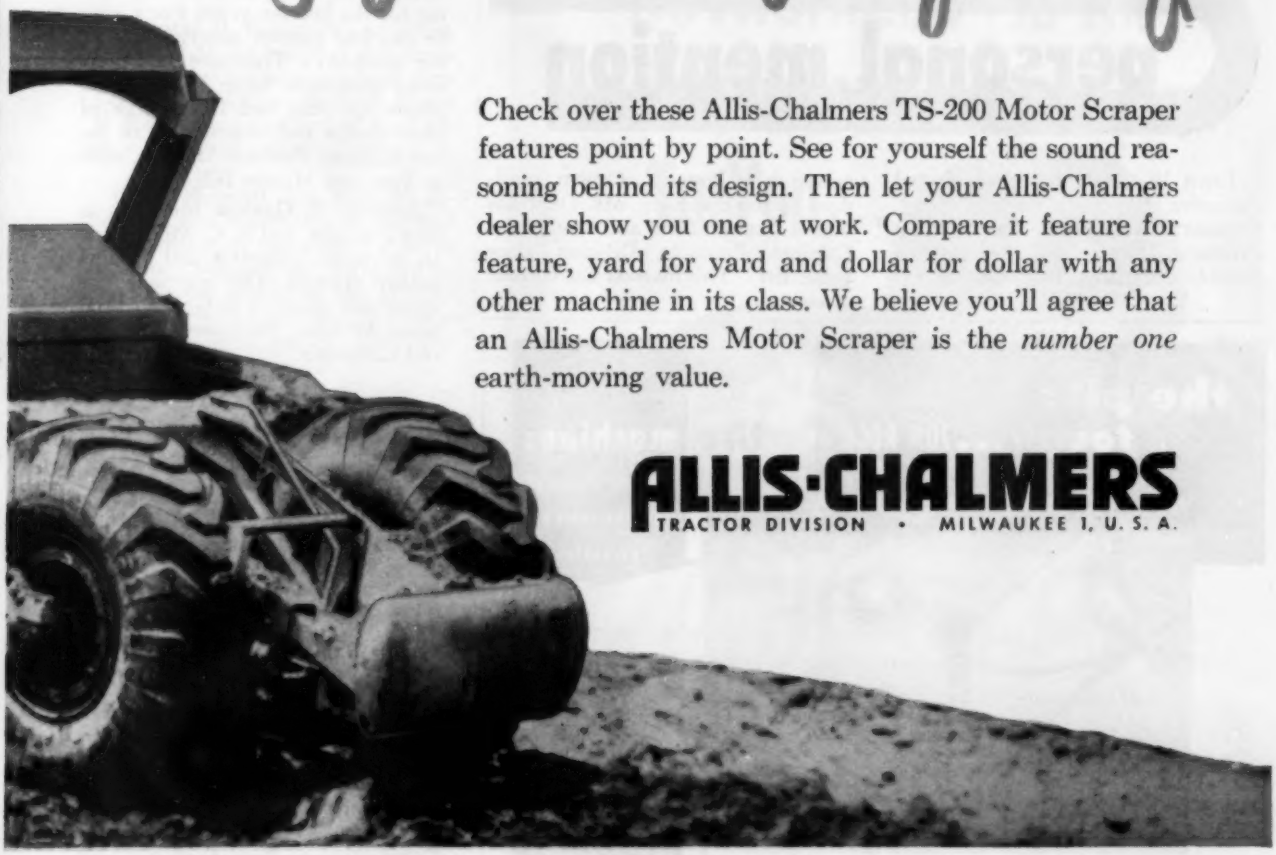




This chart shows how loading resistance continually increases as the load builds up . . . how the lower, wider bowl of an Allis-Chalmers Motor Scraper requires less time and power to get the same yardage.

PERFORMANCE MAKES DOLLARS

moving features before you buy



Check over these Allis-Chalmers TS-200 Motor Scraper features point by point. See for yourself the sound reasoning behind its design. Then let your Allis-Chalmers dealer show you one at work. Compare it feature for feature, yard for yard and dollar for dollar with any other machine in its class. We believe you'll agree that an Allis-Chalmers Motor Scraper is the *number one* earth-moving value.

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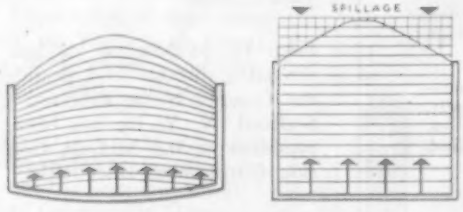
HEAPS AUTOMATICALLY

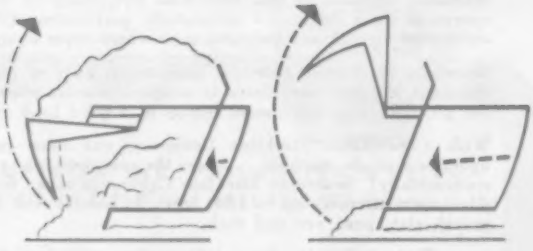
The combination of slightly deeper center cut and correctly angled cutting edge shapes the load as the scraper fills. The greater volume of dirt flowing into the center of the bowl "boils" forward, to the rear and to the sides, producing an automatically heaped load without excessive spillage.



These diagrams show how an automatically heaped load avoids costly spillage even though the center is built up above the sides of the bowl.

SPREADS EVENLY

Forward movement of ejector is timed with lifting action of apron, which provides a continuous flow of material to insure a smooth, even spread.



High apron lift prevents any possibility of material's jamming. Even when loaded from overhead, anything that can be put into the bowl can be easily ejected.

WHEN DESIGN MAKES SENSE

personal mention

JOHN W. DENT has been elected executive vice-president and T. J. DURRETT will head the Calcium Products Division of the Georgia Marble Company, Tate, Ga., as announced by James R. Cowan, president of the company. Mr. Dent has been a vice-president and head of the Calcium Products Division since June, 1947. This division has become one of the major producers of high-calcium marble dust during the last few years.

Mr. Durrett is a graduate of the Georgia School of Technology and a vice-president in charge of engineering for the last ten years. For a year he has had general supervision over the company's Tennessee and Vermont dimension stone quarries and plants and has had full charge of plant design and construction of the five Calcium Products Division mills at Tate and Marble Hill, Ga.

ASHTON E. GARNER continues as sales manager, and R. C. MCDONALD JR. as research director and product quality control. The company has plants and quarries in Georgia, Alabama, Missouri, Tennessee, Vermont, and California.

Albert B. Hood

ALBERT BURNETT HOOD, a veteran in the field of foreign trade, has been appointed export sales manager for Kaiser Gypsum Company, Inc.

Mr. Hood has been a foreign trade specialist for 30 years and has resided and traveled extensively in the Far East and the South Seas. Most recently he has been with various San Francisco Bay Area ship construction and repair companies. From 1940 to 1948 he was export manager for the Login Corporation in San Francisco and New York.

The Northwestern States Portland Cement Company, of Mason City, Iowa announces the election of PETER ANDERSEN as vice-president and assistant general manager, FRANK B. PIRKL as secretary, and GLENN R. LEAMAN as treasurer. All three appointments were effective June 1, 1954.

FRED W. MCMILLIN JR. has been elected a director and president of the Genesee Stone Products Corp., Stafford, N. Y. He has been vice-president of the McLain Construction Corporation since 1946.

HENRY V. MOTT, Detroit Lakes, Minn., who has been a field engineer for the Portland Cement Association in northwestern Minnesota for the last three years, has been named field engineer for North Dakota, succeeding P. K. LEWIS, retired. Mr. Lewis will work with the Fargo, N. D., city commission.

Another actual field report—Helena Sand & Gravel Co., of Helena, Montana, switched to this Sauerman equipment in 1946. It's been in operation since then . . . successfully performing difficult underwater excavation of rock and colloidal sand where other equipment had failed.

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SAUERMAN BROS., Inc.

DR. A. J. DIRKSEN, formerly eastern representative of the sales development department of American Potash & Chemical Corporation, has been made director of sales development.

THOMAS H. BLODGETT was recently elected to the board of the Penn-Dixie Cement Corporation of New York. Mr. Blodgett replaces Victor N. Roadstrum, who retired as chairman and chief executive officer.

G. J. MORGAN was recently appointed vice-president and assistant to the chairman of the United States Gypsum Company, as announced by C. H. Shaver, chairman. Mr. Morgan was formerly vice-president in charge of merchandising, and has served the firm since 1939.

Other promotions announced by U. S. Gypsum include the naming of A. J. WATT to the post of general merchandise manager and the appointment of G. V. LANE to succeed Mr. Watt as merchandise manager of dealer sales. Mr. Lane was previously dealer sales manager of the South Pacific Division.

ANDREW L. BURRUS, former county judge and long-time Obion County (Mich.) highway supervisor, has accepted the position of business manager of the recently organized Tennessee Limestone Producers Association, with headquarters in Nashville. His new duties will include the promotion of the use of crushed stone for road building and other purposes, and limestone for agricultural use throughout the state and the Mid-South.

ROBERT E. WILLIAMS has been assigned to the Portland Cement Association as technical representative for the turnpike program in Ohio. Mr. Williams previously held engineering and supervisory posts with the Ohio State Highway Department D., the U. S. Department of Agriculture, the Bureau of Yards and Docks, the Corps of Engineers and the Civil Aeronautics Administration.

Appointment of L. P. GALWAY as engineer in the technical service department has been announced by the Zonolite Company, Chicago, vermiculite processors.

At the same time the company announced the appointment of ROBERT D. BERGFELD as Pittsburgh architectural representative and RAYMOND J. MEDONIS to succeed Mr. Galway as architectural representative in Detroit and Wayne County, Mich.

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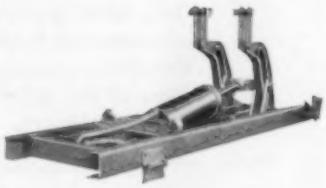
... Marion Heavy-Duty Bodies and Hoists lead the field in Performance • Dependability • Economy

It takes a mighty tough dump body to stand up under the severe abuse of day after day hauling and dumping. And it takes a powerful, heavy-duty hoist to give dependable, long-life dumping action.

Marion "Designed on the Job" bodies are made to stand abuse. No matter what kind of load, Marion Bodies are constructed to "take it."

With the Marion Heavy-Duty Hydraulic Hoist, there's guaranteed dependability . . . efficiency . . . and long-life operation — found in all Marion "Designed on the Job" hoists.

Find out for yourself why more and more truck owners are switching to Marions. See your nearby Marion distributor . . . or write direct . . . today.



There's no finer combination for handling your big hauling and dumping problems than a Heavy-Duty Marion Body and Hoist. Designed for compactness and strength, Marion HD hoists handle more work at a low, uniform oil pressure throughout the dumping cycle.

There are no high surge points any time. They have patented equalizing double arm lifts . . . combination oscillating cylinders and roller-type mechanisms. The heavy box subframes are constructed of steel for added strength and durability.

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MARION BODIES AND HOISTS

A complete line of standard and special Hydraulic Hoists and Dump Bodies To Fit Every Need

EDWARD D. DEPEW, formerly assistant secretary of Universal Atlas Cement Company, has been elected secretary and appointed general attorney, it was announced by Charles B. Baker, president.

Mr. Depew received his LL.B. degree from New York University School of Law in 1942, and was admitted to the New York Bar in 1946, after active duty in the Army Air Force. He joined Universal Atlas in 1947 as an attorney specializing in labor matters and, in 1951, was appointed assistant secretary.

CHARLES L. WALTON, formerly production engineer in the Insulation Division of United States Gypsum Company, has been appointed production manager of this division, it was announced recently by C. W. Desgrey, general manager of operations. This position was formerly held by R. C. GIMLIN, who was recently named assistant to Mr. Desgrey.

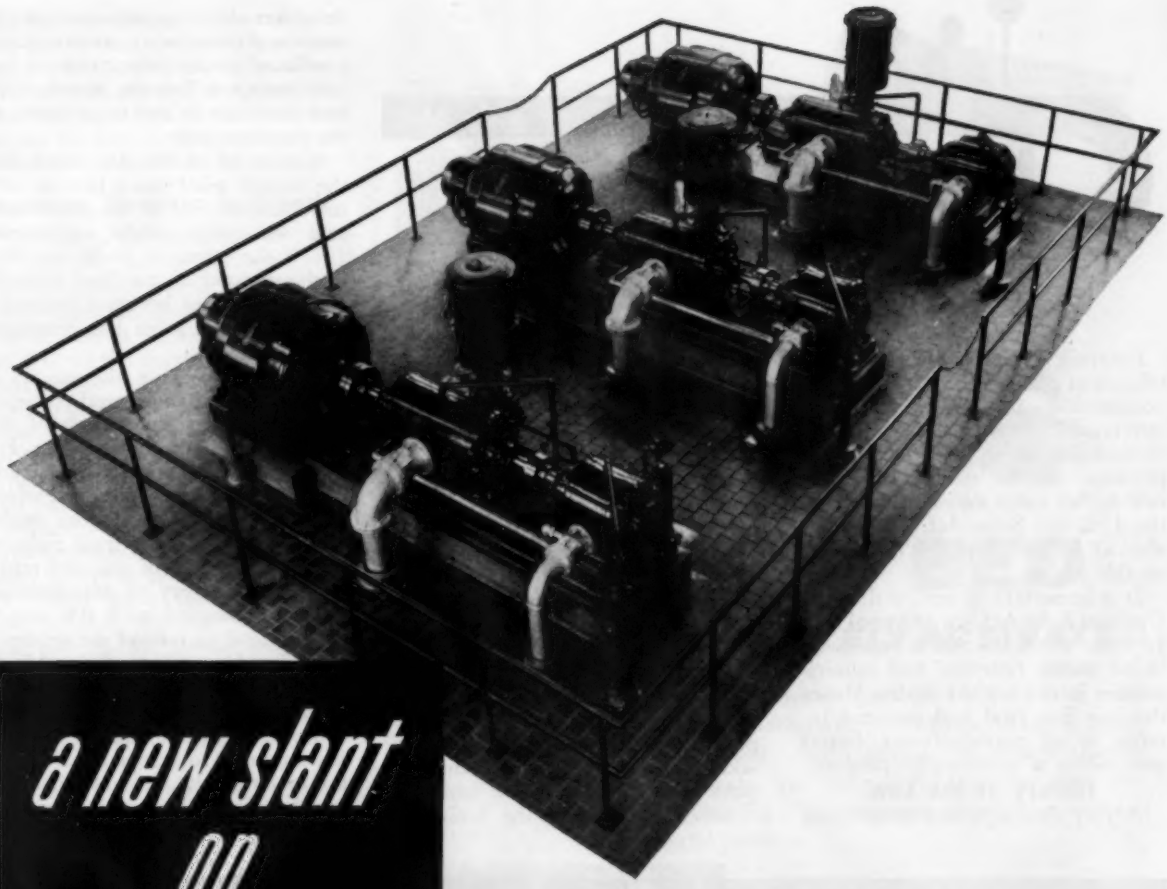
WILLIAM A. WILSON, president of PIT AND QUARRY PUBLICATIONS of Chicago, was recently appointed a member of the National Business Publications.

R. E. CERVENY, formerly plant manager for the Lone Star Cement Corporation at Nazareth, Pa., has assumed his new duties as superintendent of the firm's plant at Cloverdale, Va. Mr. Cerveny succeeds R. A. RASMUSSEN, who had served in that capacity since the plant went into operation three years ago. Mr. Rasmussen has been advanced to the post of chief engineer at Lone Star's New York office.

Two changes have also been made at Lone Star's sales office in Richmond. C. WILBUR MARSHALL has been named vice-president and manager of Lone Star's Virginia Division, to succeed Dwight Morgan, who retired. CURTIS JERNIGAN has been promoted to division sales manager succeeding Mr. Marshall.

A. S. MCCRORY of Dallas, Tex., who has been assistant superintendent of the Trinity Division of the General Portland Cement Company there, has been made superintendent of the Consolidated Cement Corporation's plant at Fredonia, Kans., to replace W. O. STUART JR., who is now plant superintendent for Consolidated at Cement City, Mich.

AUGUST R. RUMP has been appointed production manager of operations for the Western Division of United States Gypsum Company with headquarters in Chicago.



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legal decisions

By LEO T. PARKER
Attorney at Law
Cincinnati, Ohio

Recently a considerable number of officials of plants which manufacture nonmetallic products, and also buyers and sellers of these products, expressed a desire for a legal interpretation of the modern law and new higher court decisions involving the Uniform Sales Act. I shall review all important phases of the law on this subject.

It is important to realize that the Uniform Sales Act is a universal law. In other words the Act is applicable in all states, counties, and municipalities in the United States. Hence this law has vital and essential interest to all manufacturers, buyers and sellers of nonmetallic products.

History of the Law

A very thorough and time-taking review of statutes of various states reveal these interesting facts: The states of New Jersey, Connecticut, and Arizona were the first states to adopt the Uniform Sales Act. These states wrote the law into their statutes in 1907. The last states to adopt and approve the Act were Arkansas in 1941 and Colorado in 1942. The District of Columbia adopted the Act in 1937. All other states adopted and approved the Act in the years after 1907 and before 1941. In this article the latest revisions to the Act are taken into consideration.

Quite obviously the ultimate purpose of this universal law in all states, including the District of Columbia, is to enable buyers and sellers in all parts of the United States to know, with the least time, effort, and expense their legal rights and liabilities.

Other sections of the Universal Sales Act clearly explain and specify when and under what circumstances a seller of nonmetallic products has and retains a lien on merchandise and materials to secure payment of the purchase price.

Section 54 of the Act states that the unpaid seller has a lien on such merchandise: (1) if the goods were sold without a credit agreement; (2) if the terms of credit specified in the contract of sale have expired; (3) if the buyer becomes insolvent; (4) and if the seller has possession of the goods.

Generally speaking, the validity of a lien on merchandise and materials is forfeited by dispossession of the goods by the holder of the lien. For example, in *Weaver,* 209 Pac. (2d) 830, that statute was litigated which explains the circumstances under which a buyer has a legal right to rescind a contract of sale and refuse to accept delivery of merchandise. A buyer complied with this statute and decided to rescind the contract. He offered to return the goods to the seller.

In subsequent litigation the higher court held that immediately after the seller refused to accept redelivery of the materials the purchaser held the merchandise as bailee for the seller,

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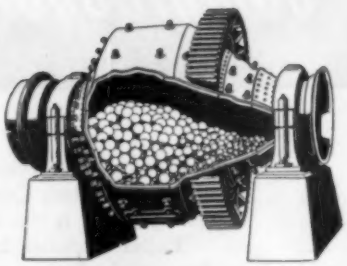

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and that the materials were subject to a lien of the purchaser for certain charges and a part of the purchase price already paid by the purchaser. Also, this court held that a purchaser forfeits his lien if he gives up possession of the merchandise.

Right of Stoppage in Transit

Section 53 of the Uniform Sales Act provides that a seller may stop materials in intransit if he knows or learns that the buyer is insolvent. This section is applicable although the title to the goods passed to the purchaser on delivery to the carrier, as when goods are shipped f.o.b. the manufacturer's plant. However, contrary to the belief of a majority, this section does not give the seller the legal right to regain title to the merchandise.

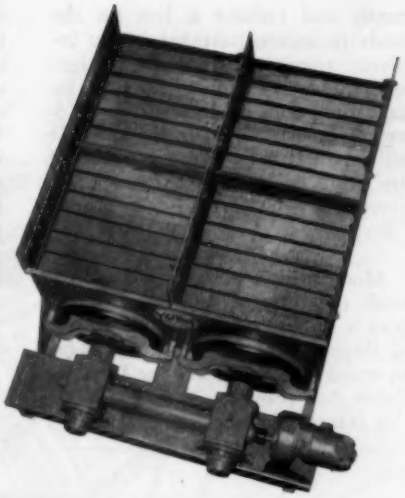
For illustration, the District United States Court held that although a seller ships goods f.o.b. the seller's location, and therefore parts with legal title to the goods, and later learns that the purchaser is insolvent, the seller may stop the goods in transit, but the purchaser still retains title to the goods. In this case a carload of materials was sold on credit, and it was in transit when the seller learned that the purchaser was insolvent.

The higher court held that while the right to stop delivery of goods sold on credit is predicated on insolvency of the buyer, yet neither insolvency nor bankruptcy of the buyer works a rescission of the contract. Therefore, stoppage in transit of merchandise does not annul nor cancel the sales contract nor divest the purchaser of legal title to the goods which may have passed on delivery of the merchandise to the carrier.

This court held also that although a buyer is or becomes insolvent and the legal title to the merchandise has passed to the purchaser, the seller may stop the goods during transit; but the seller cannot regain legal title to the goods although he has a lien on the goods to secure the purchase price.

On the other hand, this court established the law that when a carrier places a car containing nonmetallic products on a siding or side track, designated in the bill of lading, the transit is finished and the seller has no legal right to stop the merchandise from being delivered to the purchaser, and the seller has no greater nor prior rights than other common creditors of the insolvent purchaser.

Therefore, while a seller of nonmetallic products may stop goods in



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transit and enforce a lien on the goods to secure payment by an insolvent purchaser, the seller's right to "stoppage in transit" ends the instant the goods are placed on a siding for delivery to the purchaser. He still has a lien to secure payment if the purchaser refuses to accept delivery from the carrier.

Goods Not in Transit

Modern higher courts consistently hold that under no circumstances may a seller stop or take possession of shipped nonmetallic products not in transit. Section 58 of the Uniform Sales Act provides that goods are 'in transit" from the time they are delivered to a carrier, or agent for the seller, until the moment the buyer takes delivery of the merchandise from the carrier or its agent.

According to a recent higher court the goods are not "in transit" after the purchaser or consignee has accepted delivery of same at the point of destination, or at any intermediate point during transportation. However, the goods are considered as being "in transit" while in the carrier's warehouse awaiting delivery to the purchaser who has received a notification from the carrier that the goods are ready for delivery. Also, if the carrier wrongfully or illegally refuses to make delivery of the goods to the buyer, the goods are "in transit" when in the carrier's warehouse awaiting further disposition.

Another important point of law is that if only a part of a shipment of materials has been delivered to the purchaser, the part or portion of the shipment which remains in possession of the carrier is legally "in transit". See *First National Bank,* 43 Pac. (2d) 1078; and *Rome,* 110 N.E. (2d) 765.

Still another important point of law is that once an "agent" or employee of the buyer takes possession or control of shipped materials the same no longer is in transit. Hence, where a forwarder or warehouseman takes possession of nonmetallic products from a carrier by authority of the purchaser, the merchandise is not "in transit" while being transported by the forwarder or warehouseman from the carrier to the purchaser. (See *Stork,* 371 Fed. [2d] 279).

Notwithstanding this decision, a recent higher court held that when the testimony shows that a forwarding shipper or agent of the seller has no legal interest in the shipped goods and merely acts as agent for the seller, the title to the merchandise resides with the consignee, who is the proper party to maintain a suit against the carrier for loss or injury to the shipped merchandise. This situation, however, never exists when the forwarder assembled the various lots of goods for shipment in carload lots and through bills of lading assumed the responsibility for the safe transportation of the merchandise from point of receipt to point of destination. Under these circumstances the forwarder automatically assumes "common carrier" liability, and may sue the transporting carrier for damages if the shipment is lost or injured. But before the forwarder may sue the transporting carrier for benefit of the shipper or consignee, evidence must be produced which proves that the forwarder has proper and legal authority. See *Merchant Shippers Assn. v. Kellogg Express & Draying Company,* 164 Pac., (2d) 852.

When Seller Waives Lien

Section 56 of the Uniform Sales Act specifies that a seller of goods automatically forfeits his right to a lien to all but insolvent buyers when he delivers the goods to a carrier without reserving title in the merchandise, or without a written or verbal agreement that the seller still retains a lien on the goods to secure payment of the purchase price. Of course, a seller may make a valid

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contract under which he waives his right to a lien on the merchandise. This same law is applicable to all other contracts of sale.

See *Universal Company v. Funs*, 285 S. W. 516. In this case the manufacturer testified that an agent or employee of the purchaser had been sent to the manufacturer's factory for the purpose of hastening delivery of the merchandise and approving the quality of the work. On the other hand, the purchaser testified that the agent or employee had been sent to the manufacturer's factory merely to hasten delivery of the merchandise, and that he had no authority to approve the quality of the finished product.

The important points of the law presented for decision of the higher court was whether the purchaser had the legal right to accept a part of the merchandise and reject the balance if same did not equal the samples, and further, whether the acts of the purchaser's employee in inspecting and approving the materials at the factory of the manufacturer bound the purchaser to accept and pay for the full balance of the merchandise.

The higher court held that although the purchaser had accepted the first shipment, he was not deprived of the privilege of rejecting the balance of the merchandise which did not equal the samples submitted when the contract of sale was made. However, after carefully considering the evidence, the higher court held the purchaser bound to accept and pay for the complete quantity of merchandise specified in the contract, irrespective of whether the finished merchandise equalled the quality of the samples, because the agent of the purchaser had approved the merchandise at the manufacturer's factory.

Stoppage in Transit

As above explained a seller may under certain circumstances stop in transit goods shipped to an insolvent purchaser.

Section 57 of the Uniform Sales Act simply provides that when the purchaser of merchandise is insolvent, the unpaid seller who has parted with possession of the merchandise may stop the goods in transit, and have the carrier return the goods to the shipping point for the seller. Hence, section 57 does not provide that the seller may repossess the goods while "in transit" if the title to the goods has passed to the purchaser. This section clearly specifies the right of stoppage in transit when the seller discovers that the purchaser is insolvent and also that the seller has merely "parted with possession" of the goods. However, Section 56 of the Act gives the seller the right to stop in transit goods to which the purchaser already has legal title. The legal effect of this section was clearly explained above.

Private Carrier Liability

The higher courts agree that a private or contract carrier is not liable as a common carrier. A private carrier is liable for loss, damage, destruction, or theft of shipped merchandise only where the testimony shows that the carrier was negligent, or failed to exercise "ordinary" care to safeguard the shipment. Hence, while a common carrier is liable practically as an insurer of shipped goods, the legal responsibility of a private carrier is much less.

Very frequently it is necessary for the courts to determine whether a carrier is a "common" or "private" one, before deciding whether it is liable for loss, theft, damage, or destruction to paperboard or paperboard containers.

Legally, a common carrier is any carrier which holds itself out to the public as being ready to transport goods for all who demand the service. However, a private carrier is one who transports goods for only a few selected persons or firms. For example, the owner of a motor truck whose business is transporting merchandise exclusively for one or a few more shippers is a private carrier.

For illustration, in *Zell v. Industrial*, 65 Pac. (2d) 1429, it was shown that a truck company operates several motor trucks and transports merchandise for many customers on contract, but he does not haul generally for the general public. In other words, the company transports merchandise for customers it wants to haul for and refuses to haul for all others. The legal question arose whether or not the trucking company is a "common carrier". In holding the company a private carrier, the court said: "A common carrier serves the general public. . . . The truck operator here offered no such program of service, as he only served those with whom he had pre-existing contracts. He is a 'contract carrier'."

The leading case of *Cook Transfer Company*, 13 Pac. (2d) 549, clearly illustrates the liability of a private carrier. In this case the driver of a motor truck owned by a private carrier failed to place a cover or tarpaulin over merchandise when it rained. The higher court held the carrier liable for damage to the goods because the driver was negligent in failing to use "ordinary care" to protect the goods against injury.

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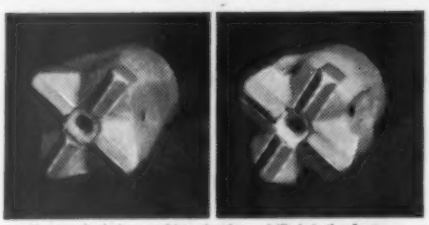

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Traffic News

CENTRAL TERRITORY RAILROADS

Freight Traffic Committee

Docket 90650 (2)—It is proposed to establish a rate of 279 cents per net ton on limestone, agricultural, unburned, in closed cars or in open-top cars protected by tarpaulin or other protective covering, from Woodville, Millersville, and Gibsonburg, Ohio, to Teays, Ohio. Minimum weight of a car 25 tons.

Docket 90651 (1)—It is proposed to establish rate of 213 cents per net ton, carloads, on limestone, agricultural, unburned (not ground or pulverized), in bulk, open-top cars, from Piqua, Ohio, to Senecaville, Ohio.

Docket 90653 (2)—Proposed to establish rate of 201 cents per net ton on carloads of limestone, agricultural, unburned (not ground or pulverized), in bulk, open-top cars, from Marion, Ohio, to Senecaville, Ohio.

Docket 90708 (1)—It is proposed to establish a rate of 87 cents per gross ton on limestone, crude, fluxing, foundry or furnace, in open-top cars, carloads, minimum weight 90 percent of marked capacity of car, except that when car is loaded to full cubical or visible capacity, actual weight will apply, from New Castle, Pa., to Youngstown, Ohio.

Docket IRC 511-1382—Proposed to establish rate of 113 cents per net ton on agricultural limestone, in open-top cars, from Lehigh, Ill., to Illinois Central Stations shown below: Biggs, Easton, Emden, Delavan, Green Valley, Havana, Holmes, Hartsburg, Mason City, New Holland, Pekin and South Pekin, Teheran, and Poplar City. Rate subject to X-175 increase.

GENERAL FREIGHT TRAFFIC COMMITTEE

Eastern Railroads

Bulletin N 1622-3—It is proposed to establish a rate on ganister rock, not ground, of $3.45 per net ton in open-top cars not protected by a protective covering, and $3.89 per net ton in closed cars or cars protected by a protective covering, from Rockwood, Pa., to Portsmouth, Ohio. The carload minimum weight is 90 percent of marked capacity of car. Rates subject to ExParte 175-B increase.

Bulletin C 1609-26—Proposed to establish rate from Piqua, Ohio, to Toronto, Ont., of $5.34 per net ton in open-cars not protected by a protective covering, and $5.83 per net ton in cars protected with a protective covering or closed cars. Rates subject to Ex Parte 175-B increase. The above rates apply on limestone, ground or pulverized, unburned, carload minimum weight 45 tons.

Bulletin N 1609-31 (Shipper)—Proposed to establish rate of $1.90 per gross ton on limestone, crude, fluxing, foundry or furnace, carloads, in open-top equipment, minimum weight 90 percent of marked capacity of car from Inwood, W. Va., to Donora, Pa. Rate is subject to Ex Parte 175-B increase.

WEEKLY DOCKET AND STATUS REPORT OF PRIOR SOUTHERN FREIGHT ASSOCIATION PROPOSALS

Docket A 18980—Proposed to establish rate of 806 cents per net ton on stone, crushed, in closed cars, minimum weight 40 tons, from Lithonia, Ga., to Sioux Falls, S.D.

Docket A 18998—It is proposed to establish rates of 577 cents in open-top-cars, and 623 cents per net ton in closed cars on limestone, ground, in 44-ton minimum carloads, from Cartersville, Ga., to Joliet, Ill. These rates reflect East St. Louis, Ill., combination.

COTTRELL WHIRLCONE

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At the Thornton, Ill., quarry of Material Service Corp., one of the largest commercial operations of its kind in the world, Supt. Ed Schwartz calls the plant's 25-in. COTTRELL WHIRLCONE separator — "Houdini"!

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Docket A 19070 (c) — Proposed to establish rate of 207 cents net ton on lime, oyster shell, burned or ground, agricultural, carload 30 tons, from Norfolk, Pinners Point, Portsmouth, and West Norfolk, Va., to Williamston, N.C.

NORTH PACIFIC COAST FREIGHT BUREAU

Docket X NC 4154 (S)—Rate of 5 cents per hundredweight is requested on limestone in carload lots from Nason Creek, to Grotto, Wash

Docket NC 4166 (S)—Rate of 11 cents per hundredweight is requested on limestone, in open-top cars, carloads, Cooper, Wash., to Olympia, Wash. Minimum weight 50 tons.

PACIFIC SOUTHCOAST FREIGHT BUREAU

Docket X 4907 (S) — Proposed to request a rate of 25 cents, minimum 30 tons, on lime (calcium), that is, common lime, hydrated, quick or slaked, from Auburn to Montague, Calif. This is described in item 140, Pacific Southcoast freight bureau tariff 273-A.

Docket X 4924 (S) — Request rate of 17 cents, minimum 40 tons, with saving clause of 30 tons on stone, that is, lava or volcanic, broken or crushed, in bulk, in open cars from Sykes to Fontana, Calif.

Docket 4987 (S) — A rate of 13 cents has been requested on stone, crushed, broken, ground, or rough, carloads, from Barstow to Paramount, Calif. Minimum 50 tons.

SOUTHWESTERN FREIGHT BUREAU

Docket 69109 (X (S) —It is proposed to establish a rate of 39 cents per hundredweight on dolomite from Dolly Siding, Mo., to Houston, Tex. Minimum weight 30 tons. Rate not subject to X-162-6-8 increases.

Docket 69154 (S) — It has been proposed to publish through one factor rate of $4.13 per net ton on limestone, ground or pulverized, from Gantts Quarry, Ala., to Monroe, La. Minimum weight 40 tons, Rate is not subject to X-162-6-8 increases.

TRUNK LINE TERRITORY RAILROADS

Freight Traffic Committee

Bulletin N 4611-15—Proposed to issue rates to meet truck competition on crushed stone and stone screenings in carloads, minimum weight 90 percent of marked capacity of car, from White Haven, Pa., and Oaks Corners, N. Y., to Ulster, Milan, Athens, and Sayre, Pa., $1.38; from Oaks Corners, N, Y., to Towanda, Pa., $1.38 per net ton. Rate is subject to ExParte 175-B increase.

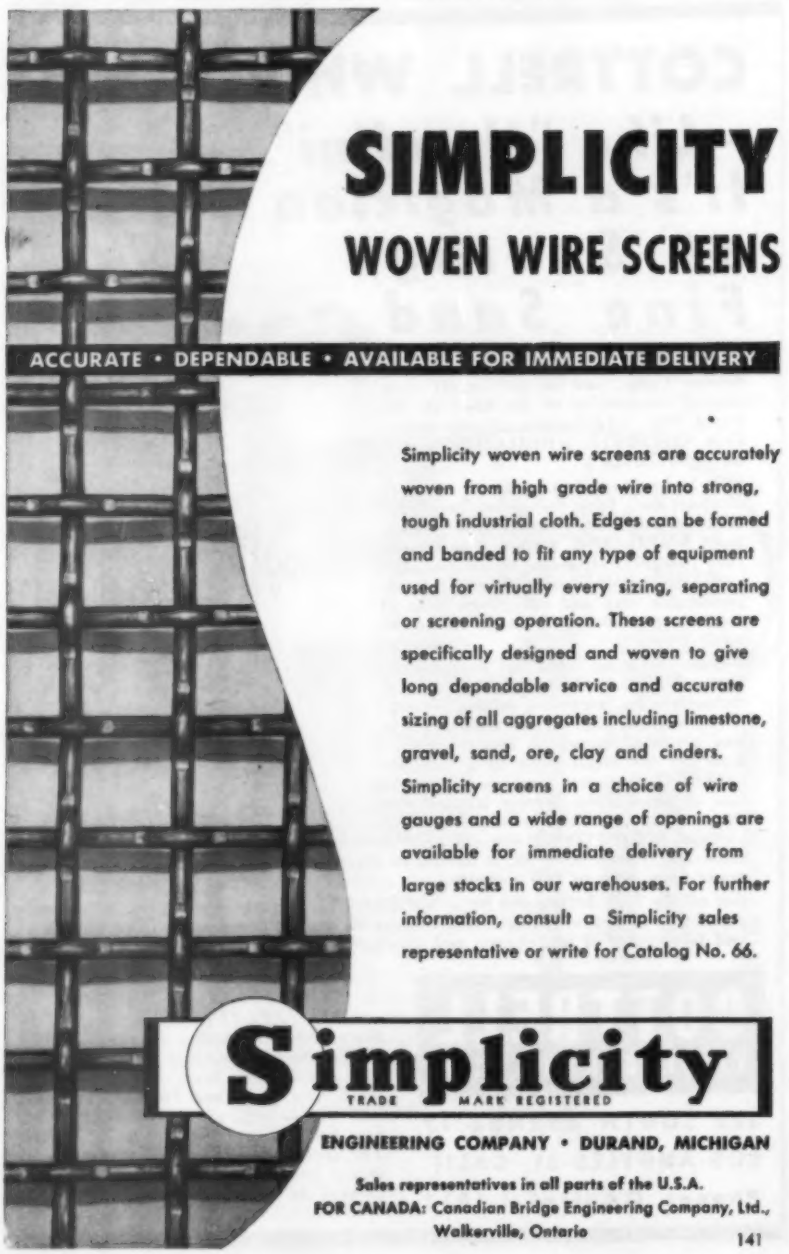
Bulletin N 4609 M-8 — Proposed to issue rate of $1.25 per gross ton on limestone, crude, fluxing, foundry or furnace, from Blue Bell, Pa., to Fairless, Pa., minimum weight 90 percent of marked capacity of car. Rate is to be issued to meet motor truck competition and is not subject to ExParte 175-B increase.

WESTERN TRUNK LINE COMMITTEE

Docket D-25-405 (S)—Proposed to establish rate of 51 cents per hundredweight to alternate with present rate of 59 cents per hundredweight on lime, carloads, from Sequiota and Springfield, Mo., to Ogden and Salt Lake City, Utah. Rate subject to X-175-B minimum weight of a car 30 tons.

Docket X-E-41-2063 (S) — Proposed to establish rate of $1.03 per net ton on stone, broken, crushed or ground, in open-top equipment, from Huntington, Mo., to Mt. Sterling, Ill. Rate not subject to X-175-B increase.

Docket X-E-41-2065 (S) — Proposed to establish rate of $1.00 per net ton on limestone, agricultural, for soil treatment only, from Linwood, Iowa, to following Iowa points: Cone, Haskins, Washington, Titus, Wellston, Rubio, Richland. Rate subject to ExParte 175-B increase.


SIMPLICITY
WOVEN WIRE SCREENS
ACCURATE • DEPENDABLE • AVAILABLE FOR IMMEDIATE DELIVERY
Simplicity woven wire screens are accurately woven from high grade wire into strong, tough industrial cloth. Edges can be formed and banded to fit any type of equipment used for virtually every sizing, separating or screening operation. These screens are specifically designed and woven to give long dependable service and accurate sizing of all aggregates including limestone, gravel, sand, ore, clay and cinders. Simplicity screens in a choice of wire gauges and a wide range of openings are available for immediate delivery from large stocks in our warehouses. For further information, consult a Simplicity sales representative or write for Catalog No. 66.
Simplicity
TRADE MARK REGISTERED
ENGINEERING COMPANY • DURAND, MICHIGAN
Sales representatives in all parts of the U.S.A.
FOR CANADA: Canadian Bridge Engineering Company, Ltd., Walkerville, Ontario
141

Trade Notes

Martin B. Jaeger, former assistant publicity manager, has been named publicity manager by Bucyrus-Erie Company, South Milwaukee, Wis. He succeeds Emory M. Heuston, who had been associated with the advertising department for 25 years. Mr. Heuston has joined the Richard T. Brandt, Inc., advertising agency of Cleveland, Ohio.

Alan R. Fisher has joined the Vulcan Iron Works of Wilkes-Barre, Pa., as engineer in the Process Equipment Division. He was formerly engaged in the engineering field in various parts of the world: Great Britain, India, Peru, Mexico, and Colombia.

Alan R. Fisher

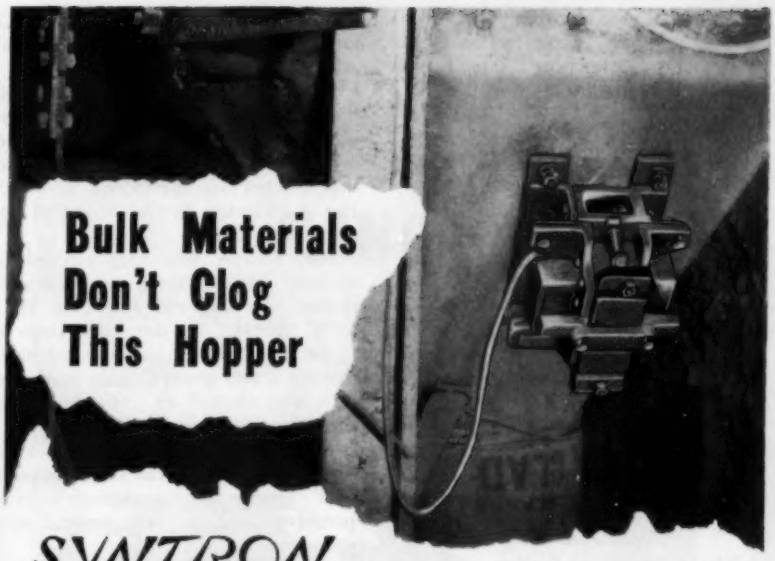
Howard L. Bayne

Howard L. Bayne has announced his retirement as manager of the Kansas City plant and sales division of Bemis Bro. Bag Company, St. Louis, Mo. He will be succeeded as manager by L. E. Cox, now assistant manager.

Mr. Bayne has been with Bemis more than 40 years at Kansas City, where he joined the oganization in 1912. He worked his way up through various departments, including sales, to the post of assistant manager and in 1949 was named manager.

Frank J. Hirner has been named district manager of Excavator Sales for the Chicago-Milwaukee offices of Harnischfeger Corp., Milwaukee, Wis. He will have headquarters in Chicago at 22 North Wacker Drive, and will direct sales for both large and small P&H excavators.

J. R. Connell has been appointed assistant general purchasing agent of the Boiler Division of The Babcock & Wilcox Co., Barberton, Ohio. He was formerly assistant purchasing agent of the Tubular Products Division of the Company at Beaver Falls, Pa.

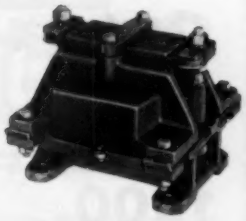


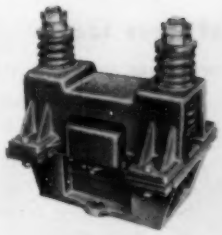
SYNTRON

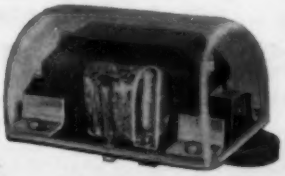
ELECTRIC VIBRATORS

. . . assure a positive flow of stubborn materials through bins, hoppers and chutes

They eliminate clogging, arching and plugging of even the most hard-to-move bulk materials. Deliver 3600 powerful, controllable vibrations per minute that assure uninterrupted production on practically any handling system. Easy to install — prevent equipment damage — reduce maintenance.







FINGER-TIP CONTROL — NO RODDING & POKING — NO SLEDGING

Controlled vibration means a free flow of materials.

Flow is continuous without using manual methods.

Write today for complete catalogue data — FREE

SYNTRON COMPANY
385 Carson Avenue — Homer City, Penna.

Bucyrus-Erie Company, South Milwaukee, Wis., has released a 16 mm sound-color film *These Users' Views*, picturing more than 30 different excavating, loading, and material-handling jobs. Showings can be arranged by contacting the company's publicity department.

Machine-gun camera pictures of Atlas Powder Company's Rockmaster blasting system have earned the firm's advertising department an award from the National Industrial Advertising Association. The presentation was made to Joseph Dannenberg, assistant advertising manager, who was responsible for a campaign based on the machine-gun pictures showing explosives being used in quarries, mines, and construction work.

The Cincinnati district office of Bailey Meter Co., Cleveland, Ohio, has moved to larger quarters at 2330 Victory Parkway, Cincinnati 6, Ohio.

International Paper Co., New York, N. Y., has announced that John H. Hinman was elected to the newly-created position of chairman of the board, the company's chief executive office. He will be succeeded as president by Richard C. Doane, vice-president and general sales manager.

Mr. Hinman, who was elected president in 1943, joined the company in 1913. He was appointed general woods manager in 1927 and was elected vice-president in 1928. He was elected to the board of directors in 1936.

Mr. Doane, who was elected to succeed Mr. Hinman as president, joined International Paper in 1924 as a member of the sales department. In 1948 he was elected vice-president and general sales manager, and was elected to the board of directors in January, 1949.

Replacing Mr. Doane as vice-president and general sales manager is F. Henry Savage, formerly vice-president and assistant general sales manager.

Joseph P. Monge was elected treasurer, replacing Carl S. Volk, who was elected vice-president and treasurer of the company's Canadian subsidiary.

Stuart E. Kay, who was appointed vice-president in charge of operation of the company's northern mills in 1951, has been assigned the direction of the company's labor and employee relations.

Why • **SCHAFFER POIDOMETERS**

OVER 1300

of these scales are now serving Industry

provide just the right answer for bulk material processors who have "scale trouble."

Poidometers are tested-and-proved fast, accurate, automatic units that weigh, blend, feed, mix, record, and proportion.

They're ruggedly built and easy to operate, assure long, economical service, and boost production figures to new highs.

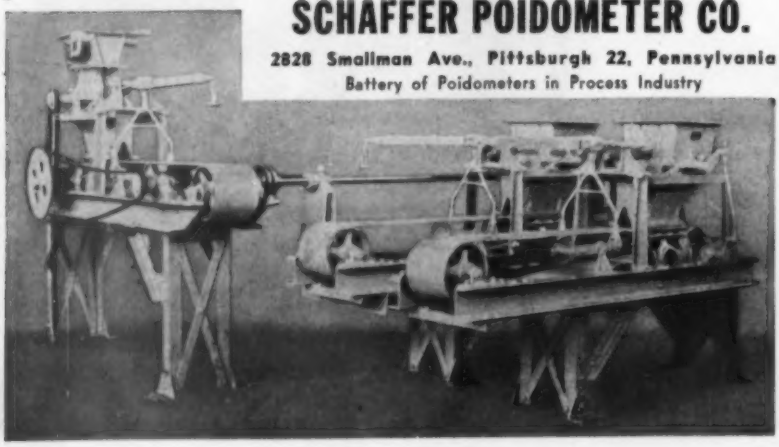
Now available with remote controls for showing and changing feed rate, and with total weight recorders.

Write for CATALOG No. 5

SCHAFFER POIDOMETER CO.

2828 Smallman Ave., Pittsburgh 22, Pennsylvania

Battery of Poidometers in Process Industry



William A. Sheets has been appointed a special sales representative of the Hammond Bag & Paper Co., Wellsburg, W. Va., in the Chicago, Ill., area to work with John E. Cornell Jr., the present representative.

Both Mr. Cornell and Mr. Sheets will make their headquarters at the company's office, 38 South Dearborn St.

Hoffman Auto Body Service, Inc., 1480 N. Grant Street, Columbus, Ohio, is now handling the distribution of the complete line of Heil truck bodies and hoists.

W. S. Berry has taken over as New York district representative for Smith Engineering Works. He replaces Harry Buckenheu, who will stay on as advisor and consultant.

Mr. Berry has been working out of the New York office for the past four years. Before that he spent two years at the Smith factory in Milwaukee training in both the shop and engineering departments.

W. S. Berry

C. F. McGunigle

C. F. McGunigle has been elected vice-president of the Syntron Baltimore Sales Company, Baltimore, Md. He will supervise sales in Maryland, Virginia, and North Carolina.

Mr. McGunigle comes to Baltimore from Syracuse, N. Y., where he was head of the Syntron Syracuse Sales Company.

The board of directors of Marion Power Shovel Company, Marion, Ohio, manufacturers of power shovels and other excavating machinery, has authorized the officers of the company to accept a proposal for acquisition by the company of controlling interest in The Osgood Company and its wholly owned subsidiaries, The General Excavator Company, and The Commercial Steel Castings Company.

W. O. Hinkley, director of the testing laboratory of the Raymond Division of Combustion Engineering, Inc., died unexpectedly at his home. He had been with Raymond Division for 17 years.

Pioneer Engineering Works, Inc., Minneapolis, Minn., announces the appointment of George M. Philpott Co., San Francisco, Calif., as a new dealer for the northwestern and west central parts of the state of California. Complete sales and service to contractors and producers of all types of aggregates will be featured.

Chester J. Noonan, vice-president of United States Rubber Company, New York, N. Y., has been appointed to the newly-created position of executive general manager of two operating divisions of the company.

In his new position Mr. Noonan will be responsible for the operations of the company's second- and third-largest divisions, the footwear and general products division and the mechanical goods division. He will report to the president.

The mechanical goods division manufactures conveyor and transmission belts, hose, electrical wire and cable, automotive parts, and other rubber and plastic products for industry.

Chester J. Noonan

Harry L. White

Harry L. White has been appointed sales manager of the Autocar Division of The White Motor Company, Exton, Pa. A vice-president of the Autocar Sales and Service Company, Mr. White was the former manager of the Pittsburgh branch. He replaces W. M. Taylor, who has resigned.

Mr. White started with Autocar as a salesman. He later rose through various positions, including manager of the Pittsburgh branch, manager of the Pittsburgh region; for several years he was in charge of the nine regional sales areas in eastern Pennsylvania and New Jersey.

Edward Lebo, public relations director of Hewitt-Robins, Inc., Stamford, Conn., has been given the additional responsibility of advertising manager. In addition to public relations, he will direct the company's entire advertising program.

Mr. Lebo joined Hewitt-Robins two years ago and previously had been a newspaperman and industrial publicist in New York.

TW

Founded 1742

TISCO®

MANGANESE STEEL

for Maximum Resistance to Heavy Impact and Abrasion

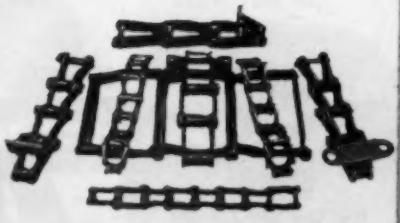
TYPICAL PARTS

Jaw Crusher Parts

Dipper Teeth

Ball Mill Liners

3-piece Mantle for Crusher



Chain for Conveyors, elevators, dredges, etc.

Specify TISCO Manganese Steel wherever parts are subject to impact and abrasion—both new equipment and replacement. TISCO provides from 2 to 5 times longer service than other alloys in this punishing work. TISCO assures the right analysis for the job—sound castings—correct heat-treatment—accurately ground dimensions—careful inspection to assure flawless castings. Write us for literature or have our engineer visit you for a discussion of your problem.

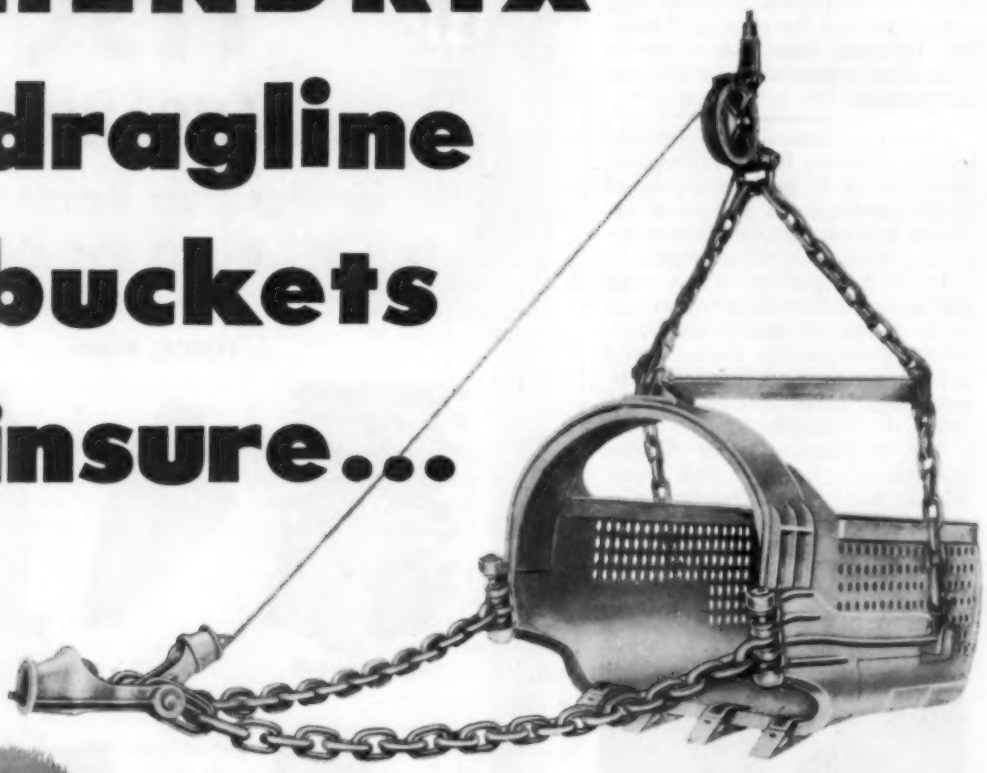
Rebuild and repair worn parts with TIMANG Weld Rod, Rounds, Squares, Flats, Plates, Repoint Bars, Grouser Bars, Tooth Repointers.

TAYLOR-WHARTON IRON AND STEEL CO.

HIGH BRIDGE 3, N. J.

Cincinnati, O. Birmingham, Ala. Easton, Pa.

HENDRIX dragline buckets insure...



3 TYPES

TYPE "LS"

A lighter weight bucket designed for levee and drainage work.

TYPE "TS"

Engineered and classified as a general purpose bucket.

TYPE "HS"

A heavy duty bucket for moving shale or any hard formation.

profitable operation on every Job!

⅜ to 40 Cubic Yards

A TYPE AND SIZE FOR EVERY DIGGING PURPOSE

Hendrix Buckets available without perforations on special order.

HENDRIX MANUFACTURING CO., Inc.

MANSFIELD, LOUISIANA

DIAMOND

Single pass

PORTABLE CRUSHING PLANTS

MADE IN FOUR MODELS

No. 116	10"x16"	30-40 Tons/hr.
No. 120	10"x20"	40-55 Tons/hr.
No. 124	10"x24"	55-70 Tons/hr.
No. 136	10"x36"	70-90 Tons/hr.

USE IT HERE, THERE — *anywhere*

Your next job is — where? Well, it makes little difference whether it's a mile or two down the road, or way on the other side of the county, if you have a Diamond Single Pass *Portable* Crushing Plant at your command. It's light in weight, designed for frequent moving and quick setup; but above all, this Diamond Crushing Plant is the ultimate for efficient, economical production.

No. 124
10"x24"
55-70 Tons/hr.

THESE FEATURES HELP YOU INCREASE PRODUCTION

- Short wheel base and wheel bar tongue location provide excellent maneuverability in road or pit.
- Hinged delivery conveyor eliminates dismantling for towing.
- Low hopper height permits easy loading, with ½ or ⅜ cu. yd. shovel. Low over-all height promotes ease of travel.
- Heavy duty grizzly with proper size openings give higher crusher production with minimum scalping.
- Adjustable single eccentric plate feeder provides a constant, even flow of pit run material.
- Vibrating screen is oversize.
- Feeder is clutch operated.
- Power unit (gasoline or diesel) is plant mounted.
- Controls are centrally located.
- Good braking effort (mechanical or air) and fully guarded drives promote safety.

SEND FOR BULLETIN 1000 AND GET ALL OF THE FACTS AND SPECIFICATIONS

DIAMOND IRON WORKS

DIVISION GOODMAN MANUFACTURING COMPANY

Halsted Street at 48th Place • Dept. 1 • Chicago 9, Illinois

Please send your Bulletin 1000.

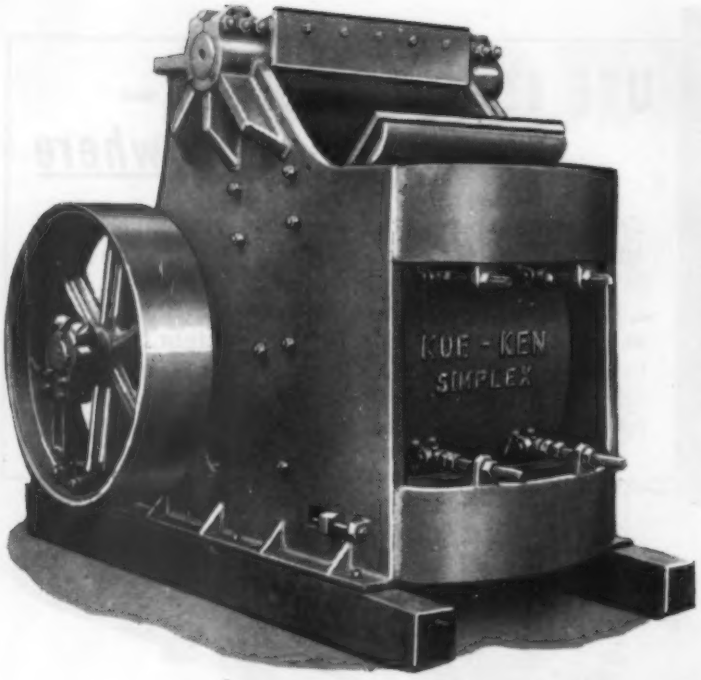
DIAMOND

Name_____ Title_____

Company_____

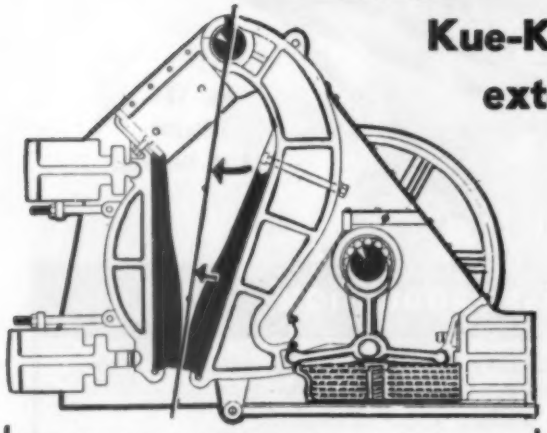
Address_____

City_____ Zone____ State_____



KUE-KEN CRUSHES ROCK AT LOWER COST THAN ANY OTHER CRUSHER

Kue-Ken's "crushing without rubbing" extends life of jaw plates 5 to 10 ← times and uses less power



← See how the Kue-Ken hinge pin is located on the center line of the crushing zone. The jaw moves in an almost straight line. Rock is instantly gripped and crushed without rubbing.

★ CRANKCASE TYPE LUBRICATION

protects mechanism from wear for the life of the crusher. Kue-Ken is the only crusher whose mechanism operates in a bath of filtered, dust-free oil. Toggles do not wear out. Change oil twice a year.

★ MORE CRUSHING STROKES PER MINUTE!

Kue-Ken operates at 375 RPM giving 25% to 50% more capacity and a more cubical product.

★ NO DANGER OF SHAFT OR FRAME BREAKAGE!

Built-in safety device releases flywheel instantly on overload. No shearing or breaking parts. Quickly reset.

LOWEST PRICED CRUSHERS PER TON CAPACITY!

KUE-KEN CRUSHERS

"LOWEST COST-PER-TON CRUSHING"

Jaw Crushers · Gyratory Crushers · Overhead Eccentric Crushers · Revolving Screens
Classifiers · Feeders · Rib Cone Ball Mills · Concentrating Tables · Vibrating Screens

Write for catalogs

STRAUB MFG. CO. 8383 BALDWIN • OAKLAND, CAL.

DEALERS: **LUND MACHINERY CO.**, Salt Lake City, Utah; **CLOSNER EQUIPMENT CO.**, San Antonio, Texas; **WASHINGTON MACHINERY CO.**, Seattle, Wash.; **CONSTRUCTION EQUIPMENT CO.**, Spokane, Wash.; **CONTRACTORS EQUIPMENT CO.**, Portland, Ore.; **MILLER MACHINERY CO.**, Missoula, Mont.; **GARLINGHOUSE BROS.**, Los Angeles, Calif.; **ANAHUAC MACHINERY CO.**, Mexico City, Mexico; **UNIVERSAL EQUIPMENT CO.**, Vancouver, B. C.

Pennsylvania Crusher Co., Exclusive Licensed Eastern Manufacturer and Distributor, 323 S. Matlack St., West Chester, Penn.
Armstrong Whitworth (Metal Industries) Ltd., Authorized Licensed Manufacturer and Distributor. Close Works, Gateshead-upon-Tyne 8, England

RALPH ROGERS CO.
9th LORAIN
digs limestone to feed 350 t.p.h. operation at Mitchell Quarry

Lorain-820 features Hydraulic Coupling for steady output

The Mitchell Crushed Stone Co., Inc. at Mitchell, Indiana, an affiliate of Ralph Rogers & Co., Bloomington, Indiana, is one of the largest modern crushed stone operations to be developed in Indiana. The quarry turns out a wide range of specification aggregates and agstone at the rate of 350 t.p.h. Modern methods and equipment are the key to a highly mechanized and efficient operation.

At the quarry face, the key to steady, high production is a new 2-yard Lorain shovel, model 820. Day-in and day-out, this rugged machine helps meet the large demands of the crusher plant. Much of the operation is geared to the ability of the "820" to maintain that steady pace. And that's one of the big reasons Ralph Rogers Co. have repeated with Lorains 9 times to serve their many and widely located operations . . . they know the meaning of Lorain *dependability*.

One of the keys to such profitable shovel performance is the Hydraulic Coupling power take-off on the Lorain 820-K. This fluid drive coupling prevents the engine from stalling even under the most severe digging conditions. The power won't fail. The 820 "hangs-on" until the toughest rock is in the dipper. Shocks, stresses and strains are "cushioned" too—just can't reach turntable mechanism or cables. Maintenance is minimized, work schedules are uninterrupted. In addition, air controls ease the operator's work in the tough digging. Again, production gets a boost.

The Lorain-820 story is worth looking into —completely. It's a story about many features, a wide selection of mountings, on crawlers or rubber tires and easily convertible front ends for a wide variety of material handling. Your nearby Thew-Lorain Distributor can tell you the "820" story in detail.

CHECK THESE LORAIN-820 FEATURES FOR YOUR JOB!

- *Equipped with smooth-acting, shock-absorbing Hydraulic (fluid drive) Coupling. Keeps full power digging—saves wear and tear.*
- *Air controls for crawler steering, tread locking pawls, travel jaw clutch, crowd jaw clutch.*
- *Air-assist on crowd and retract clutches for crowd, retract, crawler travel, boom derricking and lowering. Lessens operator's effort, retains sensitive clutch "feel".*
- *Center Drive distribution of engine power—puts it where you need it!*
- *Independent crawler travel—2 speeds.*
- *Self-equalizing turntable rollers, mounted on roller bearings —hoist and swing drums on anti-friction bearings.*

SEND FOR "820" CATALOG

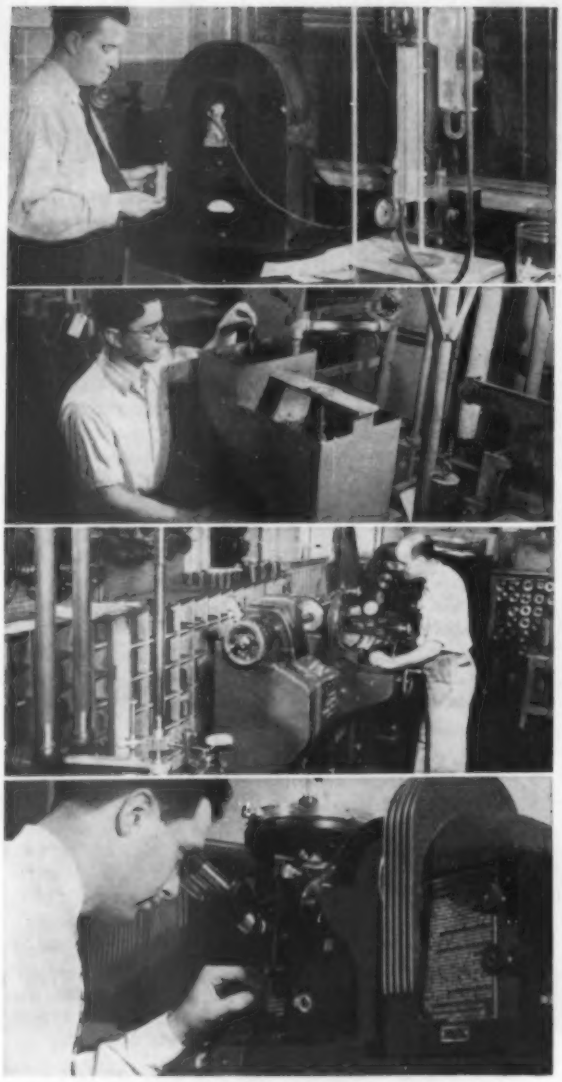
See what makes the "820" tick . . . see every detail of each major component and the Lorain design features and quality that make it a leader in the 2-yard class. A book you'll want for your files. Write to . .

THE THEW SHOVEL CO., LORAIN, OHIO

THEW LORAIN®

OFFERING MORE THAN 136 SHOVEL-CRANE COMBINATIONS ON CRAWLERS OR RUBBER-TIRES . . . TO BEST FIT YOUR JOB FOR PROFIT!

At Allis-Chalmers
Good Gear Performance is No Accident



APPROVED IN THE LAB

From design through production, Allis-Chalmers engineers know their gears inside and out. Here are a few of the modern laboratory tests and inspection techniques by which their quality is controlled:

Carbon Content Test

With this apparatus, Allis-Chalmers engineers can determine the carbon content to within .01 percent. Steel must have correct carbon content to insure heat-treating to proper strength and hardness.

Quench Test

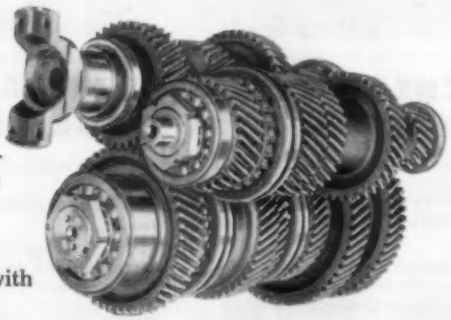
To help insure complete control over the quality of finished gears, all steel must meet specified hardening characteristics, determined here by the "End Quench Hardenability Test."

Dimension Test

Cutting tools used to make the gears, as well as the gears themselves, are measured in the gear laboratory. With this precise dimension control, Allis-Chalmers can mass-produce gears that are correct to 1/10,000 of an inch.

Metal Grain Test

Sections cut from finished gears are examined under metallurgical microscopes which magnify from 10 to 2,000 times. This test gives assurance of proper and uniform quality of grain structures in hardened gears.



PROVED IN THE FIELD

The final and most important test for any gear is its performance under actual job conditions. In Allis-Chalmers tractors, motor graders and Motor Scrapers, the quality of their gears is proved by long, efficient service on the toughest earth-moving jobs.

Technical and practical experience like this, coupled with the most modern heat-treating and manufacturing facilities, adds hours of maintenance-free performance to Allis-Chalmers earth-moving equipment.

Write for complete literature on any unit in the Allis-Chalmers line.

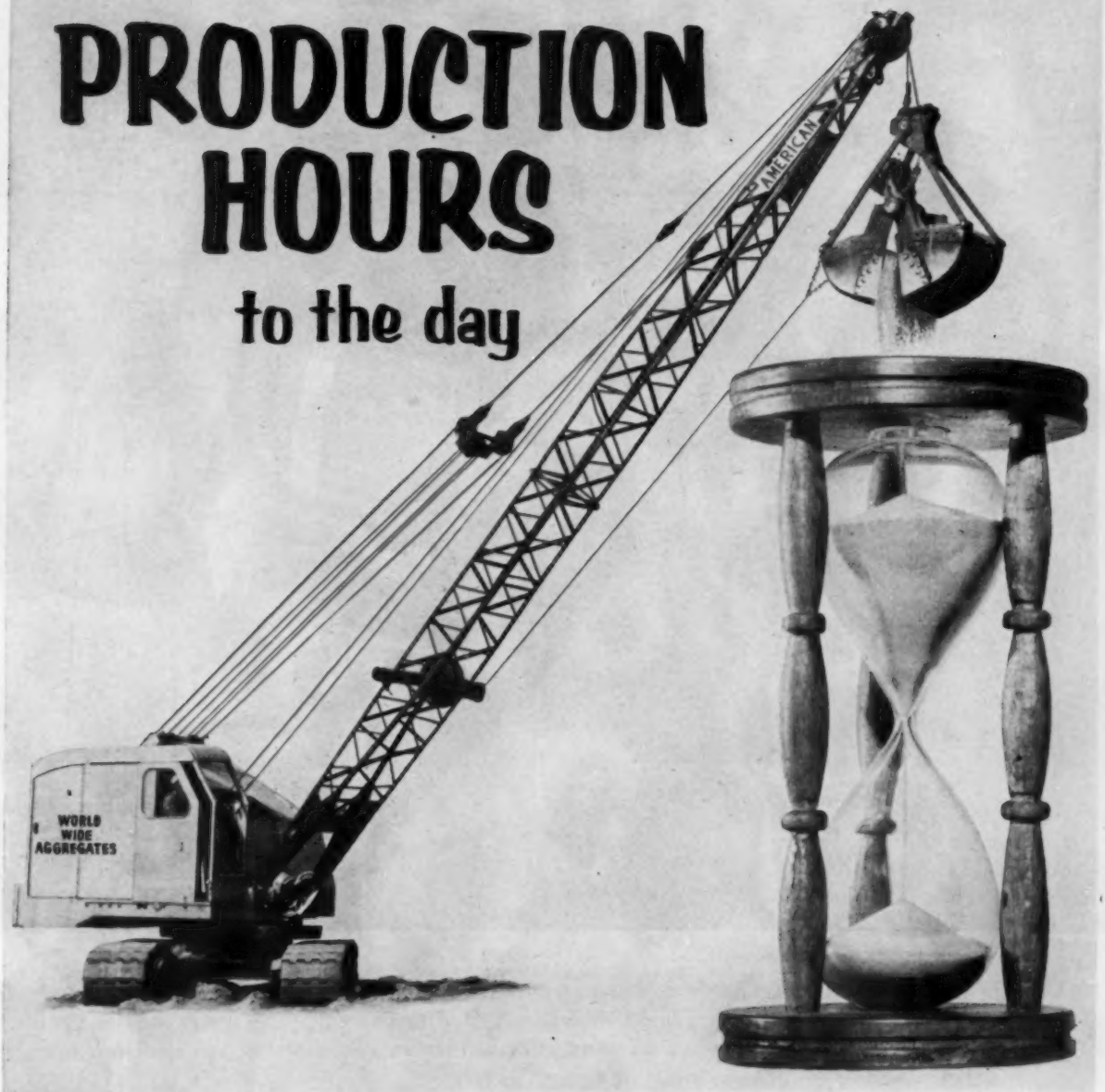
ALLIS-CHALMERS
TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

How the American 375...

adds

PRODUCTION HOURS

to the day



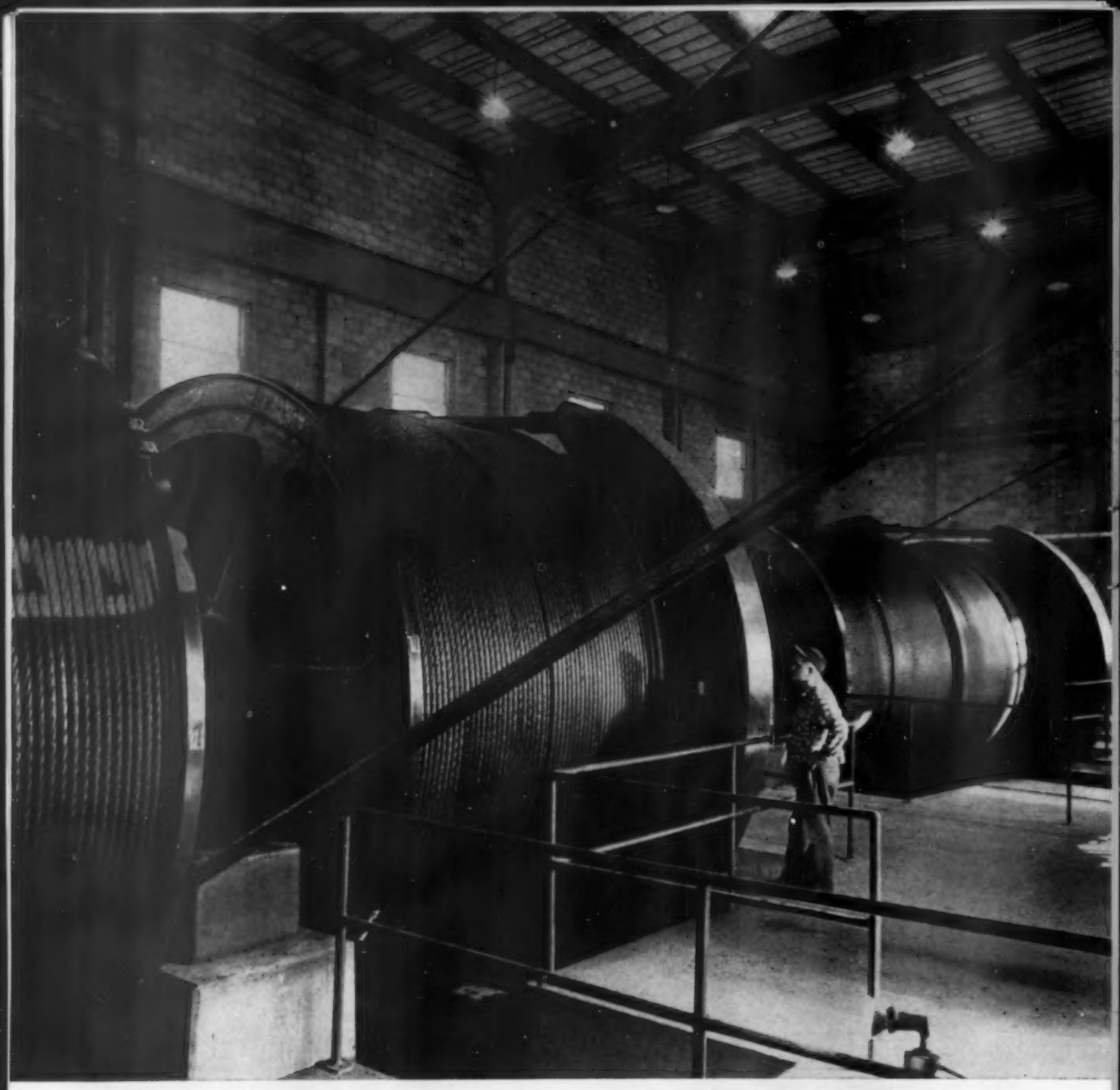
On job after job, the American 375 does more work faster! Why? Because extra capacity is built right in! Capacity loads, *load after load*, add extra minutes to every working hour. Extra minutes that pay off in extra profits!

It'll pay you to find out about the American 375 . . . crawler or truck crane, it invites comparison! Write or call your nearest distributor!

American Hoist
and DERRICK COMPANY
St. Paul 1 Minnesota

Manufacturers of:

Crawler & Truck Cranes • Steel Derricks • Crosby Blocks • Wire Rope Sheaves • Locomotive Cranes
Hoists • Portable Material Elevators • Genuine Crosby Clips • Revolver Cranes • Utility Hoists



Wire Rope at Work—In northern New Jersey is the Mt. Hope iron mine of the Warren Foundry & Pipe Corporation. It is a model of good housekeeping and mining efficiency, as this view of the hoist house indicates. The hoisting apparatus consists of two separate installations, one of which operates the balanced ore skips, the other a man-and-materials cage.

Depth of the shaft is 2750 ft, and levels are at 1700, 2100, and 2500 ft. The skip travels at 1800 ft per min; the cage, 800 ft per min with personnel, 1200 when carrying material. The handling of the heavy loads is entrusted to Bethlehem wire rope, Purple Strand grade, and almost three miles of this sturdy rope is used on the two hoists. Here Purple Strand is doing its usual reliable job, meeting every demand of the rigorous service with plenty to spare.

Bethlehem Steel Company, Bethlehem, Pa. On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

Mill depots and distributors from coast to coast stock Bethlehem rope for the following industries and numerous others:

MINING • CONSTRUCTION • PETROLEUM • EXCAVATING • QUARRYING • LOGGING • MANUFACTURING

August 1954

THE CONCRETE MANUFACTURER

A SPECIAL SECTION OF PIT AND QUARRY

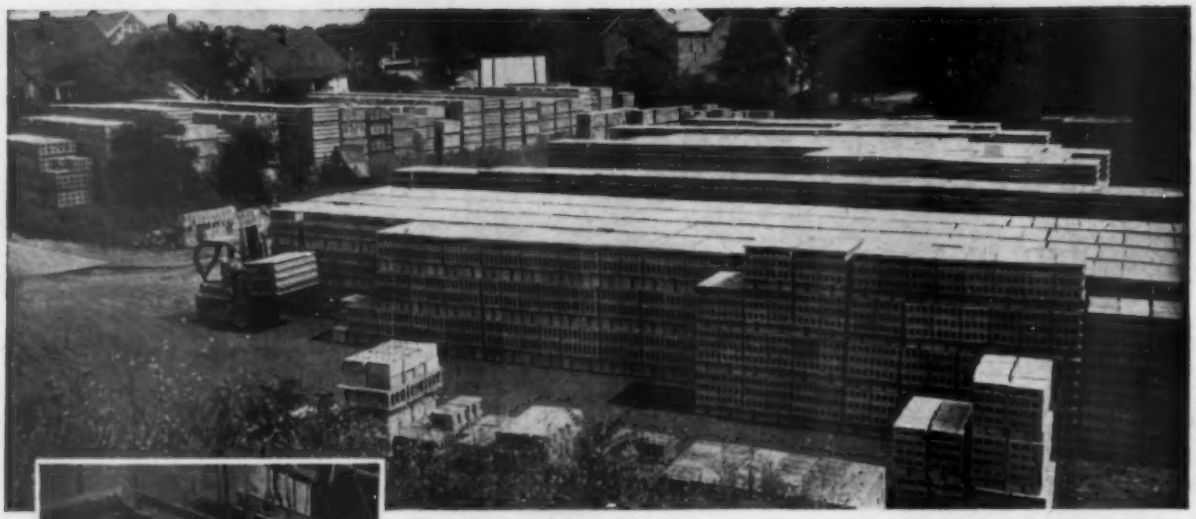
Edited for Producers of

Concrete Building Units

Pipe

Ready-Mix Concrete

View of R. H. Wright & Son's Production Plant (See Page 158)



TRIM-LOOKING blocks made with Duraplastic Cement don't stand long in the yard of Grandview Gravel Block Company . . . these are ready to fill orders for construction of every description.

INTO THE MIXER goes Atlas Duraplastic Cement at the Grandview Gravel Block Company. Duraplastic makes a more plastic, cohesive mix . . . produces superior concrete products at no extra cost.

"We get a faster-selling, more attractive block with Duraplastic*"

"From both angles—sales and production—we get a better block with Duraplastic," says Frank Salamone, partner in Grandview Gravel Block Co., Schenectady, N. Y. "Customers go for our block—pleasing in color and texture. And in the plant," Mr. Salamone continues, "Duraplastic reduces breakage."

More and more manufacturers are discovering this combination of sales appeal and economy offered by Duraplastic Cement. Mixes are rubbery and cohesive . . . feed easily through the machine . . . to produce cleanly formed block highly resistant to the passage of water. Reports also show that Duraplastic reduces the number of culls and throwbacks.

YET DURAPLASTIC COSTS NO MORE

Sells at the same price as regular cement. Requires no unusual changes in procedure. Complies with ASTM and Federal Specifications. For descriptive booklet, write Universal Atlas Cement Company (United States Steel Corporation Subsidiary), 100 Park Avenue, New York 17, New York.

"THRIFTY" SAYS: Profits go up . . . when you cut production costs with Duraplastic. Manufacturers report less breakage of green products . . . fewer costly culls and throwbacks.

"NIFTY" SAYS: Good appearance and good sales go together. Duraplastic-made products have clean true edges and corners . . . richer face texture, especially when harsh aggregates are used.

OFFICES: Albany • Birmingham • Boston • Chicago Dayton • Kansas City • Minneapolis • New York Philadelphia • Pittsburgh • St. Louis • Waco

*"Duraplastic" is the registered trade-mark of the air-entraining portland cement manufactured by Universal Atlas Cement Company.

CM-D-158

ATLAS®

DURAPLASTIC

AIR-ENTRAINING PORTLAND CEMENT

Makes Superior Concrete Products at No Extra Cost

UNITED STATES STEEL HOUR—Televised alternate weeks—See your newspaper for time and station.

The CONCRETE MANUFACTURER

Aug. 1954

Ready-Mix Quality Must be Maintained

DURING its infancy and also during other periods of its comparatively brief history the ready-mixed concrete industry has suffered from the shortsightedness, or perhaps the ignorance, of a small minority of its members. In nearly every major marketing area there has been at one time or another a producer who, for some reason, has produced concrete below standard in quality. This may have been done to undersell a competitor, to compete with job mix, or through just plain carelessness. Whatever the reason, the result is always the same—a black eye for all ready-mixed concrete.

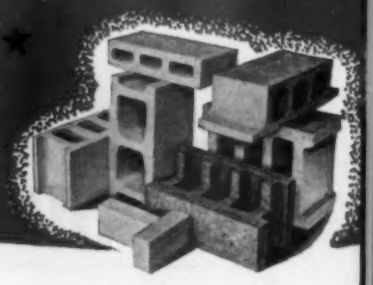
The ready-mixed concrete industry has come a long way since its early days and is now definitely big business. It is estimated that in 1953 more than 53 million cubic yards were produced, valued at more than 636 million dollars, and using in excess of 71 million barrels of cement. Ready-mixed concrete has gradually become accepted by most users of concrete as a suitable building material for all types and sizes of jobs, as is evident from the volume of sales. There are, however, many highway departments, government bureaus, and other discriminating users of concrete who do not fully accept ready-mix, often due to prejudice, but also often due to some bad experience.

The use of ready-mixed concrete will continue to grow, perhaps more rapidly than the use of concrete in general, but it will never approach the limit of its potentialities until all possible users are sold on this product. This can be done only by continuing to improve the quality of good concrete, and by educating or eliminating those who produce concrete of inferior quality. The former can be achieved by everlastingly striving for better and more uniform concrete and by selling on the basis of quality and service. A continuing emphasis on quality in the minds of customers should make them more discriminating in their buying, with the result that it will be increasingly difficult for fringe producers to sell an inferior product on the basis of price alone.

One of the most popular of the television-radio programs, "Dragnet", has pointed out repeatedly that the actions of one "bad cop" can cancel out in the public eye the honesty and devotion to duty of thousands of other policemen. This is equally true of ready-mixed concrete. One producer turning out bad concrete can tear down in the eyes of the architect, engineer, and contractor the good reputation built up for this product through years of honest and conscientious operation by the industry in general.

Walter E. Trauffer

Another BESSER Booster ★



★ This is the 111th of a series of ads featuring leaders in the Concrete Products Industry who are stepping up block production with Besser Vibrapac machines.

Officers of Thorold Concrete Products Co. — the 3 Pennachetti boys, John, Aneo and Primo, and their father, Joseph Pennachetti, Vice President.

President John Pennachetti at the ground breaking ceremonies for the new Besser Block Makers' School at Alpena, Mich. John is also President of the National Concrete Products Assoc., of Canada.

Vibrapac-equipped Thorold Concrete Block Plant Recently Celebrated 30th Anniversary

Paralleling the progress of the Besser Mfg. Co., Thorold Concrete Products Co., of Thorold, Ontario, Canada, started 30 years ago in a modest garage building. Today, the company's massive plant and storage area covers more than 8 acres, as shown in the aerial view below.

The Thorold Company prefers Vibrapacs for producing high quality block. They concentrate on concrete and celocrete units. Production totaled more than 5,000,000 units (8" or equivalent) during the past 12 months. In 1952, the company's rear pallet feed Vibrapac was supplemented with a modern front pallet feed Vibrapac.

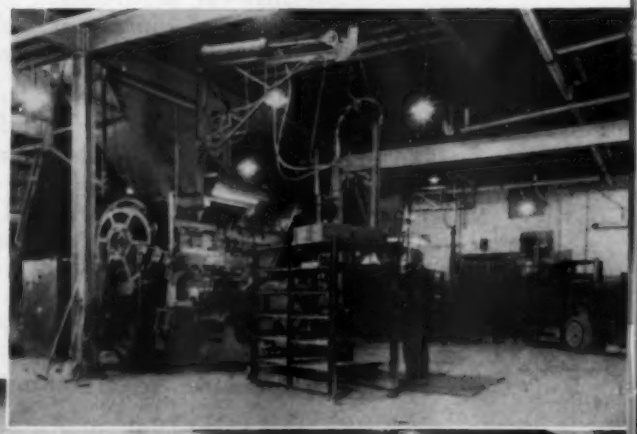
The ultra-modern office of the Thorold Company was constructed of Vibrapac Block and serves as a show room for prospective customers. Each office features a different block pattern and demonstrates the versatility of Vibrapac Block.

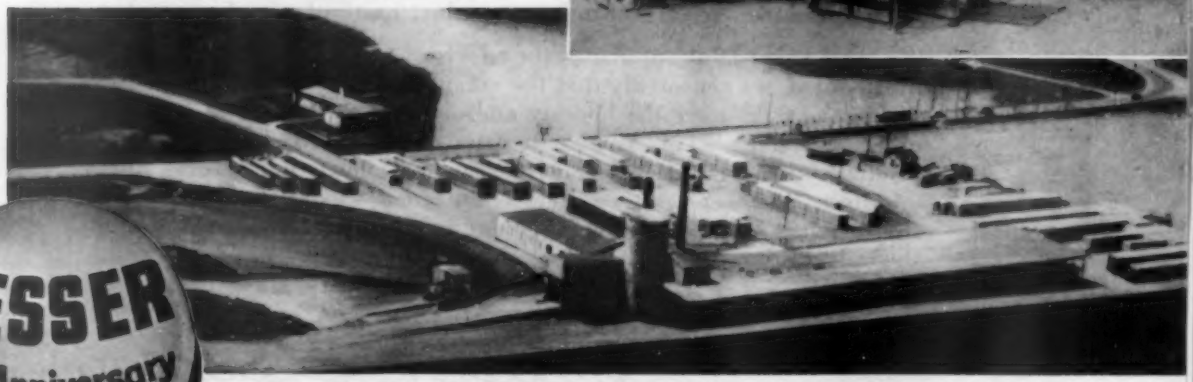
BESSER MANUFACTURING CO., Box 131, Alpena, Michigan, U. S. A.

Complete Equipment for Concrete Products Plants

The ultra-modern Thorold office building, including display of block made with Besser Vibrapacs.

Interior of the Thorold plant, showing Vibrapacs in operation. New Front Pallet Feed Vibrapac in foreground produces 10,000 units (8" or equivalent) per day.





Aerial view showing the modern Thorold Plant at Thorold, Ontario, Canada.

BESSER
50th Anniversary
1904-1954

A Half Century of Concrete Masonry Progress!

NEWS OF THE CONCRETE INDUSTRIES

Missouri R.M.C. Producers Form State Association At Columbia Meeting

According to an announcement released by Lon C. Ware Jr., 11 ready-mix producers recently formed the Missouri Ready Mixed Concrete Association at Columbia, Mo.

Mr. Ware stated that the association had been organized by its founders (from the northern part of Missouri) after meeting every six months for the last two years. So valuable did these men find the conferences and talks on mutual problems that they decided to establish a formal organization. Members are contacting as many ready-mix producers throughout the state as possible in an effort to make the association a statewide affair.

Zenith Concrete Products Installs Two Autoclaves

Two big autoclaves for high-pressure steam-curing of concrete block have been installed at the Zenith Concrete Products Company's plant in Duluth, Minn. Each of the 128-ft. long pressure vessels cures 3,672 units at one time.

It was stated that the autoclave high-pressure-steam method of curing not only cuts the amount of cement required in the block by 40 percent, but also reduces curing time from 28 days to 10 hours. Another advantage cited is greater uniformity of block because shrinkage is decreased by 50 percent. To transport the autoclaves from the William Bros. Boiler & Mfg. Company, Minneapolis, Minn., to the Zenith plant six flat cars were required.

New Block-R.M.C. Plant Uses Latest in Equipment

The L. W. Riney Company, Hannibal, Mo., is now producing concrete block and ready-mixed concrete in a new plant. In the newly installed ready-mix batching plant the equipment includes C. S. Johnson bins, controls, concentric-type batchers, scales, and water-measuring devices.

Aggregates for concrete block are taken from the track dump by screw and belt-bucket elevator to Johnson overhead material bins which feed into new concentric batchers equipped with dial scales for weigh-proportioning. Electronically-controlled water-measuring devices permit accurate and speedy water control. A new Stearns 50 plain-pallet block machine turns out over 700 standard units per hour. Clark lift trucks convey the units to the steam-curing booms.

Coming Events

August 9-11, 1954—Atlantic City. Annual conference of lightweight block manufacturers, sponsored by the National Cinder Concrete Products Association. Claridge Hotel.

August 24-25, 1954—Murray Bay, Quebec. Directors' meeting, National Ready Mixed Concrete Association. Manoir Richelieu.

October 18-22, 1954 — Chicago. 42nd National Safety Congress and Exposition. Conrad Hilton Hotel.

October 25-27, 1954 — St. Louis. Annual short course of instruction. American Concrete Pipe Association. Hotel Statler.

October 28-29, 1954—Los Angeles. Regional meeting. American Concrete Institute. Statler Hotel.

New $150,000 Crushing Plant Installed by Ace Concrete Co.

At Dishman, Wash., the Ace Concrete Company, which four years ago bought out the Ace Sand and Gravel Company, has placed in operation its own new $150,000 crushing plant, a setup designed expressly for the needs of the firm.

According to Loyd J. Borjessan, president of the firm, the new plant has a capacity of 1,600 cu. yd. per day, "enough to take care of future business for quite a few years". This installation was erected on a new site, not on the location of the old plant. Ace only recently completed the moving of its pre-mix plant at a cost of about $100,000. Locating all operations on the same side of the street eliminates traffic hazards. Only the company's offices and garages are on the opposite side.

In addition to the new crushing plant, Ace has acquired seven new trucks, bringing to 14 the number of units in its fleet of mixers.

John B. Jardine, Fargo, N. D., a concrete producer of that city, was recently named vice-president of the north central area of the National Society for Professional Engineers.

Price, Streblow Head Structural Products Div. Formed by Basalt Rock Co.

Basalt Rock Company, Inc., Napa, Calif., which produces lightweight expanded shale aggregate, masonry units, precast concrete buildings, and materials and steel products, has announced the formation of a structural concrete products division.

Harold A. Price has been named manager and Jack A. Streblow sales

Harold A. Price

J. A. Streblow

manager of the new division. Mr. Price, who will be in charge of all operations including engineering, manufacturing, and construction, formerly headed the company's Strestcrete Division. Mr. Streblow was formerly in charge of the precast concrete department. These two units now form the Structural Concrete Products Division.

At the same time it was announced that Ross Rudolph will be technical representative of the new division, with headquarters at Napa. He will be available for consultation on the use of the company's lightweight aggregate and precast concrete products.

J. E. Evans Concrete Products Starts New Pipe Operation

Early production is scheduled for the Concrete Pipe Division's plant at Shelbyville, Ind. (The division is a new branch of the J. E. Evans Concrete Products Company, Inc.) This announcement was released by Paul K. Welsh, general manager, who designed the plant and supervised its construction. Mr. Welsh stated that an open house will be held later this year, to exhibit "the most modern pipe plant in the United States today".

In the new facilities, occupying 17,500 sq. ft. of floor space, concrete sewer pipe and culvert pipe of all sizes will be turned out—from 8-in. diameter 4-ft. sections to 7-ft. diameter sections 6 ft. long.

STEARNS 50-3 ... Eastern Block Plant's 6-WAY ANSWER to SUCCESS

George Weisman, Jr., owner of Chick's Block Company, Gibbsboro, N. J., packs a world of praise for the Stearns Manufacturing Company and their latest triumph, the Stearns 50-3 Complete Package, Concrete Block-Making Machine, into the accompanying letter. He includes six of the many ways in which this completely automatic, one-man, three-at-a-time machine has led to his company's outstanding success. They are:

CHICK'S Block Company
GIBBSBORO • NEW JERSEY
PHONE, LAUREL SPRINGS 4-1700

Stearns Manufacturing Company, Inc. June 29, 1954
Adrian, Michigan

Gentlemen:

We would like to have you know our appraisal of the Stearns 50-3 Concrete Block Machine we purchased this spring.

Our production has increased beyond our expectations. The blocks produced are superior to any we have ever seen and are meeting with high favor with our customers

We were able to reduce our manual force upon the installation of our Stearns 50-3 and, most important, gain the good will of our employees who appreciate the labor-saving features of this new machine.

To date we have experienced no mechanical problems with the 50-3 and do not expect any serious difficulties to arise with a machine so well constructed.

We can sincerely state that we are very well pleased with the 50-3 and believe we have made an important contribution to our business position in this area with its installation

From the very beginning we have found your company sincere and helpful in every possible way, and we know our pleasant relations will long continue

Yours very truly,
George Weisman, Jr.
CHICK'S BLOCK COMPANY
George Weisman, Jr.

1 PRODUCTION INCREASED
—"beyond our expectations."

2 SUPERIOR BLOCKS
—"superior to any we have ever seen."

3 CUSTOMER CONFIDENCE
—blocks "meeting with high favor."

4 LOWER MAN-POWER REQUIREMENTS
—truly a one-man machine.

5 EMPLOYEE GOOD-WILL
—through labor-saving features.

6 STEARNS 50-3 CAN REALLY TAKE IT!
—"*no mechanical problems* . . . with a machine so well constructed."

Here is the Stearns 50-3 in Chick's Block Company plant, operating smoothly, easily, with all the mechanical perfection Stearns' third of a century's engineering experience has given it—*with all the features (and then some) you yourself have asked for in the up-to-date manufacture of concrete block.* This sturdy machine, which comes equipped with the *Stearns Pneumatic, Magnetic Offbearer* and the *Stearns Automatic Pallet Return* which cleans and oils the plain pallets enroute to the pallet magazine, operates on the Stearns *Unidirectional Vibration Principle,* just as the Stearns 15 and 50. *All working parts are out in the open*—"easy-to-get-at."

WHY GAMBLE!—CHECK WITH ANY STEARNS OWNER!
FOR TOP PRODUCTION AND QUALITY—SEE STEARNS!

STEARNS
MANUFACTURING COMPANY • INC
ADRIAN • MICHIGAN

COMPLETE CONCRETE PRODUCTS PLANT EQUIPMENT — STANDARD OF THE INDUSTRY

● In order to keep fill, used in the construction of a parking lot, from washing down a steep enbankment, interlocking concrete staves were used to form a retaining wall by the Lafayette Hotel, Marietta, Ohio. These staves, manufactured by The Marietta Concrete Corporation, normally are used in the construction of farm silos and industrial storage tanks. This new usage was developed by the company's own Research and Product Development Laboratory.

Accident Control Stressed In New Booklet on Safety

National Safety Council's new booklet, *Plus Costs,* tells concisely how accidents add to the cost of doing business and nibble at profits, and outlines the "why" and "how" of accident control. Intended specifically for those small firms with relatively few employees and no safety staff, *Plus Costs* sets down seven easy steps for eliminating accidents and suggests sources of help.

Single copies of the eight-page booklet, attractively illustrated with two-color drawings, may be obtained by writing the Small Business Program, National Safety Council, 425 N. Michigan Avenue, Chicago 11, Ill.

Cen-Vi-Ro Mfg. Corp. Plant Sold, Moved to California

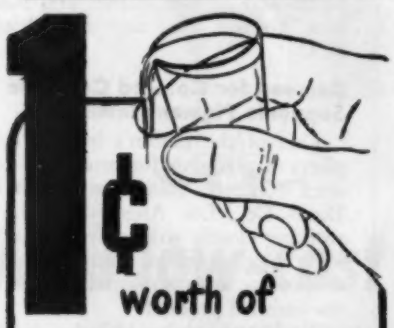
Sale of assets of the Cen-Vi-Ro Manufacturing Corporation of Nampa, Idaho, formerly a subsidiary of the Idaho Concrete Pipe Company of that city, to the new Cen-Vi-Ro Pipe Corporation of Delaware has been announced by the Boise, Idaho, office of Morrison-Knudsen Construction Company.

The manufacturing facilities of the purchased company will be moved to South Gate, Calif. This operation will be backed by Morrison-Knudsen, the Idaho Concrete Pipe Company, and the Raymond Concrete Pile Company, New York. J. B. Bonney, now vice-president and general manager of Morrison-Knudsen, will be president of the new firm.

Idaho Concrete Pipe will continue its operation in Nampa.

About Our Cover Picture

● The cover photo this month shows the top-notch transit-mix plant of R. H. Wright & Son, Inc., in Fort Lauderdale, Fla., which is described in this issue (pp. 158-162). The plant features the use of a 120-mix selector system, which enables the firm to produce automatically aggregate batches of 120 different combinations of sizes and types. Other features of the operation include an outstanding safety program and two-way radio communications.



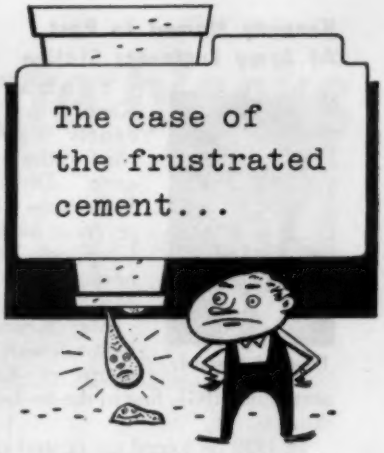
1¢ worth of Spray-O-Bond Plasticizer Per Bag

Gives Concrete Units Greater Cohesion Increased Plasticity, Better Texture.

We'll prove it! Send for a free sample of Spray-O-Bond Plasticizer today.

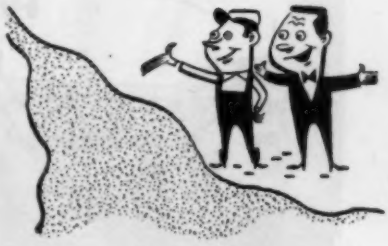
spray-O-bond

2225 N. Humboldt Ave.
Milwaukee 12, Wisconsin



In a Chicago cement block plant a short time ago, production was really at a standstill. Try as it would, the frustrated cement just trickled through the hoppers and bins instead of flowing along steadily.

But a CLEVELAND vibrator solved the problem. In short order the trickle of cement increased to a flood.



And, we might add, production really got moving too.

Tell us your materials handling problem, or ask for our detailed literature.

AIR *and* ELECTRIC

2710 Clinton Avenue • Cleveland 13, Ohio

Kennedy Named to Post At Army Engineers Station

Thomas B. Kennedy

Thomas B. Kennedy was recently named chief of the Concrete Division, Waterways Experiment Station, Corps of Engineers, Vicksburg, Miss.

Mr. Kennedy has been with the Corps of Engineers since 1931, first in the St. Louis district.

In 1939 he joined the central concrete laboratory of the North Atlantic Division, located at the U. S. Military Academy, West Point, N. Y., and transferred to Mount Vernon, N. Y., when the laboratory was relocated there. In 1946, when the functions of the central concrete laboratory were transferred to the Waterways Experiment Station, he became chief of the concrete branch of the Concrete Division.

James M. Satterfield has been appointed general sales manager of the Roanoke Ready-Mixed Concrete Corporation of Roanoke, Va., according to a recent announcement of William H. Carder, vice-president. Mr. Satterfield has been Roanoke sales representative of the Lone Star Cement Corporation for nine years.

Established in 1937, the Roanoke concern operates concrete producing plants at Roanoke, Salem, and Radford Arsenal, Va., and at Raleigh, N. C.

"Let it rain, snow, sizzle or blow—our tepee is concrete block."

Demand for Colored Concrete Supports Pigment Industry

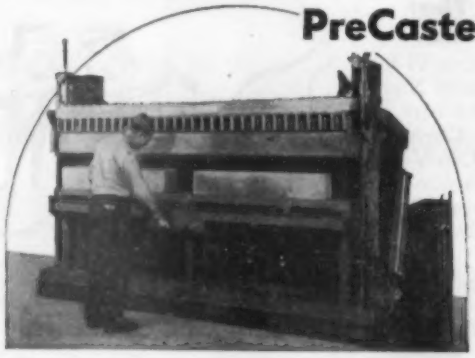
One of the nation's leading suppliers of pigments for producing colored concrete units, the Frank D. Davis Co., Los Angeles, Calif., is working closely with makers of concrete blocks, bricks, and decorative shapes to assure desired results in the finished product.

Technical advice includes recommendations for the correct type of pigment to suit the particular kind of aggregates and cement used, and how to achieve the desired permanent color in block or brick at the lowest possible cost.

According to Frank D. Davis, who heads the concern, demand for colored concrete is greater right now than at any time in his 32 years devoted to supplying dry colors to the industry. The company maintains large stocks of coloring materials at strategic distributing points.

Philip E. Shaw, 65, founder and owner of the Shaw Concrete Company of Urbana, Ill., died on June 18. His three sons will carry on the business under the new firm name of Phil E. Shaw's Sons.

PreCaster magic



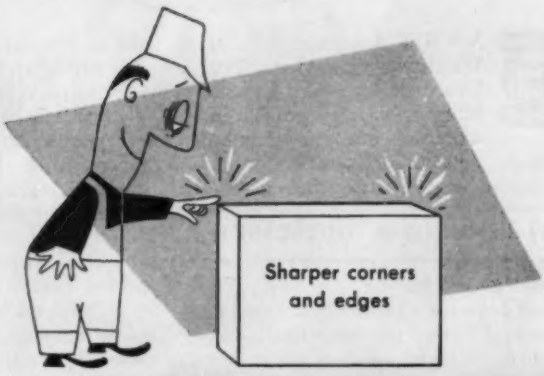
profits from hard to make units

- Be the first in your market to offer quantity production prices on concrete units that will strip through a straight box . . . slabs, lintels, highway guard rail posts, fence posts, joists, parking lot markers, channel roof, etc.
- Now you can book volume orders for any of these precast concrete units . . . hard to make by hand methods. Cut costs by Pre-Caster's fast production and build handsome profits . . . better than 100% markup.
- Write for data sheet and price list. You'll find that the relatively low investment will pay real dividends and be amortized fast!

- *Extra heavy* . . . stripper head frame of two heavy 2" x 3" cold rolled steel bars.
- Superb electrical vibration from two V-200 Syntron units.
- Handles any aggregate.
- One man operation.
- Makes units with 4" variations up to 10' long . . . lintels 4" x 8" or 8" x 8" up to 10' long.
- Overall: 7'6" high . . . 11'6" long . . . 4'0" deep . . . shipping weight 4620 pounds.

PreCaster Inc. • 5217 Beech Street • Cincinnati 17, Ohio

STRONGER concrete blocks



Block made with D-40. Note the fine texture, color and appearance—the sharp edges and corners.

with low-cost D-40

Ask us about the outstanding results concrete block manufacturers are getting by adding one to two ounces of dry, granular D-40 per bag of cement at the mixer. D-40 not only will help you make a greatly superior product but at the same time will reduce your operating costs.

D-40 is a ready-to-use additive supplied in economical 85# bags—available at conveniently located supply points throughout the United States.

Ready-mixed concrete producers have also found D-40 improves their product

ORONITE CHEMICAL COMPANY

For complete information, samples and technical help, write or call the Oronite office nearest you.

ORONITE CHEMICAL COMPANY

200 Bush St., San Francisco 4, Calif. • 714 W. Olympic Blvd., Los Angeles 15, Calif.
30 Rockefeller Plaza, New York 20, N.Y. • 600 S. Michigan Ave., Chicago 5, Ill.
Mercantile Securities Building, Dallas 1, Texas

2898

Florida's
Pushbutton Transit Mix Plant

another ON THE SPOT report

ABOUT a year ago R. H. Wright & Son, Inc., Fort Lauderdale, Fla., a large building material and construction firm in southern Florida, placed in operation one of the most modern transit-mixed concrete plants in the industry. The plant features a pushbutton batching setup having an electrically-controlled 120-mix selector which enables the firm to produce 120 different size and type batches of aggregates and cement automatically. The operation simply involves setting a mix selector, adjusting a repeater mechanism, and pushing a starter button; the plant then automatically and accurately weighs out the various materials. Provisions are also made to record the weights graphically and to compensate for varying moisture content in the sand.

By KENNETH A. GUTSCHICK

The pushbutton plant, which was designed and built by the C. S. Johnson Company, permits an all-time high in flexibility of concrete batching. The first of its kind ever built, the plant has five times the selection ability of any previous model. The forerunner of this plant, the Ready Mixed Concrete Company of Covington, Ky., was described in an earlier issue of PIT AND QUARRY.[1]

In setting up the new facilities, the Wright firm replaced an older manually-operated batching plant. Major new equipment added during the modernization program, which involved an expenditure of $125,000, included the following: a 24-in. by 230-ft. 300-t.p.h. belt conveyor; a Johnson Octo-Bin equipped with high and low signals and having a capacity of 500 tons of aggregates and 450 bbl. of cement; two 995-bbl. cement tanks; the control panel with its nine material weigh dials, each having individual pen-recorders; six aggregate batchers; and one batcher each for cement, water, and admixes. The new plant has a potential capacity of 240 cu. yd. per hour, although peak hourly production to date has been about 140 cu. yd.

Besides operating a top-notch transit mix plant at Fort Lauderdale, the Wright firm also produces ready-mixed mortar, sand plaster, and stucco at the same location. Other noteworthy features of the operation include the use of two-way radio communications, an outstanding safety program, and a well-equipped testing laboratory. Brief descriptions of these features will be given later.

Transit Mix Plant

According to George Ford, company vice-president and general manager of the transit-mix department, the high degree of flexibility was specified in designing the new plant in order to accommodate all possible variations in aggregates, both now and in the future. Concrete is sold solely on the basis of strength by the Wright firm, and the mixes are designed according to the combined F.M. (fineness modulus) method.[2] This method was adopted because of the variation in the gradation of Florida aggregates.

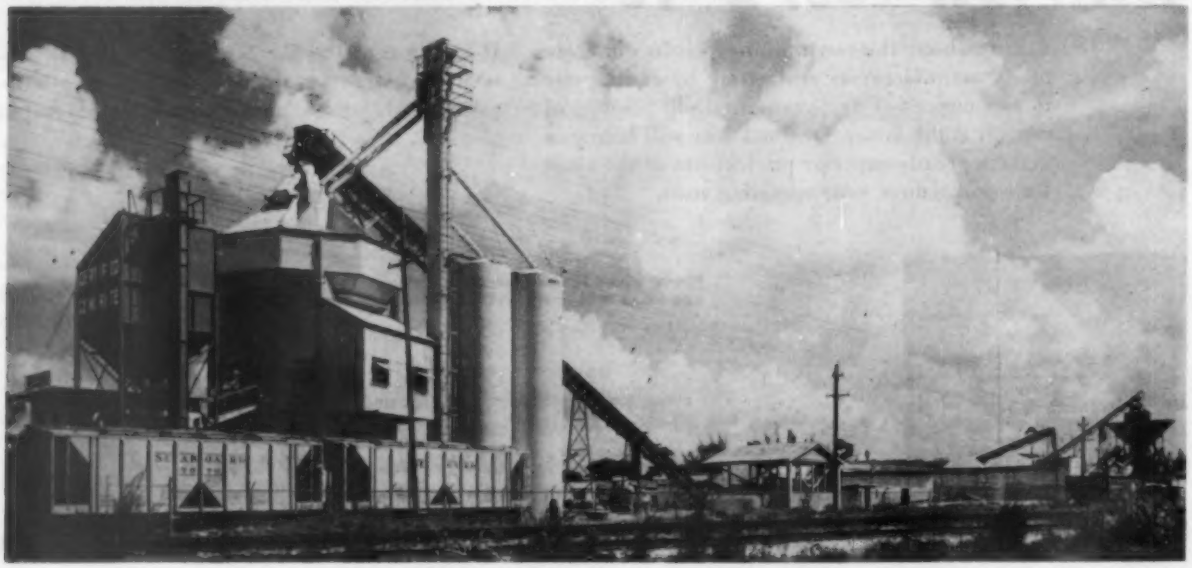
The practice followed at Fort Lauderdale is to determine the F.M. of the sand every morning. If there is a change of 0.1 or more from the preceding day, a different class of predetermined mixes is used. For each F.M. class (*i.e.*, 2.45-2.54) there are 12 possible combinations of batches, including 2,000, 2,500, and 3,000 p.s.i. concrete, each in ¼-, ½-, ¾-, and 1-cu. yd. amounts. In this manner there are 120 predetermined mixes, which take into consideration all possible variations in the F.M. of the aggregates.

The aggregate-handling facilities at the plant are interesting. Materials

[1] Avery, William M., *Versatile Batching Plant*, PIT AND QUARRY, July, 1952, pp. 266-268.

[2] This is contrasted to the Covington, Ky., plant, where mixes are based on 3-, 4-, 5-, and 6-in. slump selections.

General view of R. H. Wright & Son's new pushbutton ready-mix plant, which features a 120-mix selector control unit. On the right is the firm's ready-mixed mortar plant and antenna used in two-way radio communications.



are brought in by rail and truck and discharged into an undertrack hopper or a truck hopper, respectively, located adjacent to each other and over a short 24-in. belt conveyor. The conveyor leads to a short 18-in. radial belt, which in turn feeds a battery of ten ground-level concrete bins. These bins are arranged in the shape of an L, with nine of the units serving the concrete plant and the other one the mortar plant. Each bin holds about 175 tons. The materials are reclaimed from storage by means of tunnel belt conveyors; the one leading to the concrete plant is the new 24-in. by 230-ft. unit. A Johnson pivoted distributor, operated from ground level, directs the materials to the proper compartment.

Bulk cement is also received by rail or truck, and is stored in three all-welded steel units, including the two Johnson 995-bbl. silos serving the new batching plant and a Blaw Knox 600-bbl. bin used for storage of special cements. An 83-ft. high bucket elevator feeds either the batching plant or the two silos; a 47-ft. bucket elevator serves the third bin. Cement is reclaimed from the silos by a cross-screw conveyor.

Raw materials are obtained from a variety of sources in Florida and Alabama. Cement is brought in from plants at Ft. Lauderdale, Tampa, and Bunnell; sand from Lake Wales; gravel from Alabama; and crushed stone from the firm's affiliate plants, at Deerfield and Hallendale, Fla.

The 500-ton Octo-Bin has six peripheral compartments used for aggregates (two for sand and four for coarse aggregate) and two central compartments accommodating two types of cement. Mounted immediately below the Octo-Bin are seven of the plant's nine automatically-operated weigh batchers. Six of the units are used for aggregates, each having a 5,000-lb. capacity. The 3,000-lb.-capacity cement batcher is equipped with two plug-type fill valves with provision for the selection of either of the two types of cement available. The two sand batchers are equipped with potentiometers to determine the moisture content of the sand; automatic compensation can be made for the varying moisture content by merely setting a dial.

Rounding out the weighing facilities are a 2,000-lb. water batcher and a 5-lb. (80-oz.) batcher for air entraining admixes; both are located in one corner of the batching floor. Water, which is obtained from a company well, is stored in an 800-gal. tank ahead of the water scale.

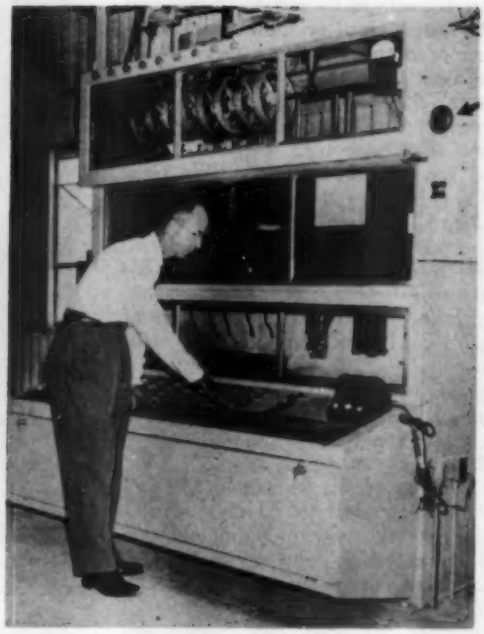
The heart of the Wright plant is

Construction scene during the building of the new ready-mix plant. Structure on left is the old manual batching plant.

A radial 18-in. belt conveyor delivers the aggregates to a battery of 10 bins; the materials are then reclaimed by tunnel belt conveyors.

A 4½-cu. yd. ready-mix truck ready to leave for the job. In the upper left is the ready-mix plant under construction.

Above: View of the batching floor, showing the 5,000 lb. capacity aggregate weigh batchers. Note the radial single-clam gates, which are air-operated. Also note that a portion of floor (lower right) is made of glass, thus enabling the operator to view the loading of the truck mixer.



Right: Wyatt B. Hodges, president of the firm, at the central dial scale control unit. Arrow at right points to the 120-mix selector. Individual dial scales, pen recorders, and selector wheels are shown in this view.

the central dial scale control unit, which controls all of the batchers; it also automatically records the weight of each single material-weighing unit. The pen recorder provides the operator with a constant check of the operation of the automatic equipment. Since the graphic record indicates both the full weight and empty weight of the batcher, it is impossible to miss a portion of the batch due to hang-up of the discharge without the operator being aware of it. The central control unit is complete with time and date stamp, relays, lights, pushbuttons, and other features characteristic of fully-automatic plants.

The nerve center of the control unit is the 120-mix selector and the repeater mechanism, the latter providing for an uninterrupted automatic rebatching of any one selection a predetermined number of times. The selector and a hand wheel, located on the right-hand side of the glass-covered air-conditioned control cabinet, makes the various mix selections possible. Through proper shafts and gearing, the master wheel positions the individual selector wheels for each weigh batcher by rapidly setting the cut-off weight for each wheel. Accurate weighing is assured through use of micro-switches as cut-off devices, which are incorporated in each scale unit.

The hand wheel is provided with a positive lock which prevents accidental change of selection during batching. The wheel assembly is engineered to enable the operator to switch rapidly from one mix to another.

One of the unusual features of the Wright plant is the use of increment batching. Batches are made up in one cu. yd. amounts or less, and discharged into a collecting cone above the truck mixer. For a 4-cu. yd. load, the operator first sets the mix selector for a one-cu. yd. batch of the mix desired, then sets the repeater dial on the number 4, pushes the starter button, and the plant automatically weighs out the proper charge. For an order involving a fraction of a cubic yard, the general practice is to batch the fractional amount first and reset the selector on 1 cu. yd. for the remainder of the load. The operator has a 15-second interval in which to make this change. By use of this method, a 5-cu. yd. load can be charged into a truck mixer in about 1½ minutes, representing more than a 100 percent time saving, when compared to Wright's earlier conventional batching plant.

The use of relatively small batches in this method has a number of important advantages. First, since all of the dry materials are collected in one hopper, there is a desirable premixing of the material prior to discharge in the truck mixer; this is said to reduce the "ball-up" and "build-up" in the truck-mixer drum. Since some mixing action occurs in the mixer between the time the first batch and subsequent ones enter the mixer, batching and discharge is rapid. Furthermore, this method reduces the possibility of overflowing at the truck receiving hopper, which occasionally occurs when an entire charge is being loaded into the mixer at one time.

Another interesting feature of the Wright plant is the use of air-operated single clam radial-type gates on the aggregate bins, which aid in providing speed and accurate weighing. Going along with the automatic operation of the plant, these gates are closed gradually during the loading operation; when the batch is half-loaded, the gate is closed to about a one-quarter opening. There is also provision to operate the gates manually, since any over or underweight load will not discharge automatically.

Still another feature of the plant is a special water-jacketed charging cone developed by C. S. Johnson, which keeps the water separate from the dry materials until the charge leaves the cone and enters the truck-mixer collecting hopper. During the descent from the cone to the truck hopper, the water coming through the jacket forms a complete curtain around the materials; this serves to cut down on dust and to effect a better ribboning of the water with the dry materials. In addition there can be little or no buildup of material inside the collecting cone, since the water does not come in contact with the materials until they have left the cone. There is also provision to adjust the height of the cone to the truck height by means of an electric drive motor operated by pushbutton.

Communications A high degree of efficiency is attained in plant operation and concrete deliveries by means of various types of communication facilities, particularly two-way radio. Radio

Dispatcher Eugene Bradshaw using a transmitting unit (shown in center of photo) to issue an order to the batching plant operator. Radio set for contacting truck mixers is at right. Lights on panel boards indicate disposition of trucks.

George Ford, vice-president and general manager of the concrete department, contacting a radio-dispatched truck mixer from his office by means of a 50-watt remote control radio unit.

equipment, which was supplied by General Electric, consists of a 50 watt Type SC228 station transmitter and receiver, a high gain antenna, three Type EC-10-C remote control units (located in Mr. Ford's office, the dispatcher's office, and the maintenance shop), and 35 mobile units, including two Type MC-204 50 watt units and 33 Type MC-203 10 watt units. The 50 watt sets are located in Mr. Ford's car and one company superintendent's car. The 10 watt sets are distributed among the company salesmen and superintendents and the ready-mix trucks. All of the firm's fleet of 30 transit-mix trucks are radio-dispatched. The fleet consists of four Rex 5½-cu. yd. mixers, five Rex 4½-cu. yd., 7 Smith 4½-cu. yd., 2 Jaeger 3-cu. yd. and 12 Jaeger 7-cu. yd., all mounted on Mack A52 and A40 chassis. All of the trucks are tandem-axle units which permit delivery over the soft, sandy terrain typical of southern Florida.

By means of two-way radio, the company is able to keep a close check on all its delivery trucks, knowing their disposition at all times. A visual record of the whereabouts of each radio-dispatched truck is kept in the dispatcher's office; for each truck there is a red, green, and amber light, mounted on a panel board, indicating a truck in the yard, on the job, and in transit to and from the job, respectively. The two-way radio system also permits loads to be diverted readily.

Communications between the dispatcher and the batching plant operator is through a Telautograph system by means of which orders written by the dispatcher are automatically and simultaneously recorded at the batching floor.

A loud speaker system directs the movement of trucks in the yard; one speaker on the batching floor permits the operator to direct the truck being loaded. A portion of the batch floor is glass covered, thereby enabling the operator to observe the truck loading operation.

A panel board equipped with signal lights and a bell, located in the aggregate reclaiming tunnel, keeps the yard man informed as to the high and low positions of the various compartments of the Octo-Bin. High and low lights and bell signals are also used for the cement silos.

Laboratory Since concrete is sold on a strength basis, the Wright firm operates a well-equipped testing laboratory. Equipment includes a Baldwin-Lima-Hamilton 300,000-lb. capacity compression testing machine, a curing tank, an air meter, a set of mechanical Gilson testing screens, specific gravity apparatus, a Los Angeles abrasion machine and permanent-type curing molds. Daily tests are made of samples taken at random in order to insure the production of the highest quality of concrete. Tests are also performed on request by customers.

L. E. Davis, secretary-treasurer of the firm. In the background is an attractive mural painting depicting the various activities of the Wright concern.

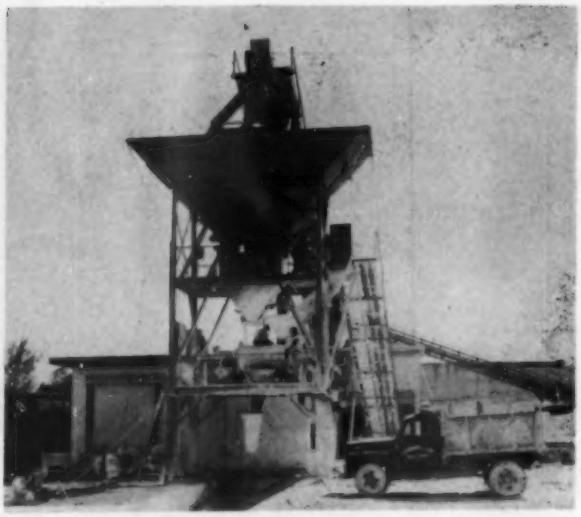
Safety The Wright firm has a very effective safety program, particularly for drivers, which provides bonuses on a monthly basis for safe driving. The new program, which was inaugurated about a year and half ago, has proved to be very successful. Prior to the new program, awards were given on a yearly basis instead of monthly. The main disadvantage of this procedure was that if a driver had an accident early in the year, he was ineligible to receive an award for the year. As a result, he had no incentive to drive safely during the remainder of the year.

The program works like this. The company sets aside $100 per year per driver, $60 of which goes into a general fund and $40 into a special fund. For each month a driver avoids an accident, he is awarded $5 (from the general fund) and also 100 points. If he has an accident, he loses out on the $5 award, but still is eligible for points. In the case of an accident, one point is deducted for each dollar involved in the accident. If the driver at the end of the year has a minimum of 1,000 points, he is entitled a share of the "kitty," which is derived from the $40 special fund plus the amount left over at the end of the year from the general fund. The amount awarded to each driver is prorated according to his point total.

Extra awards are given for lengthy safety records, *i.e.*, $50 for a 5-year accident-free record, $60 for 6 years, and up to $100 for 10 years.

Other facets of the company's safety program include informal monthly evening meetings for all workers, during which accidents are thoroughly discussed, safety movies are shown, and safety talks given. The entire program is led by a safety council, consisting of a safety director and two members, the latter elected

Left: View of the 300,000-lb. capacity concrete testing machine. Note permanent type curing molds on floor.



Right: View of the ready-mixed mortar batching plant, where the lime putty, sand (and cement) are batched and mixed preparatory for truck delivery.

by the drivers. One member of the group is a driver; the other two are supervisors or executives of the company.

Ready-Mixed Mortar The Fort Lauderdale plant also has a separate department for producing various ready-mixed lime products for the building trades, including finish lime putty (slaked lime), sanded plaster (lime putty, white silica sand, and gauging plaster), mortar (lime putty, cement, and mason sand), and stucco (lime putty, silica sand, and cement). Both high-calcium pebble lime and high-magnesium hydrated lime are used in the plant, being shipped in by rail. Paddle-type mixers are used to slake the pebble lime, after which the product is pumped to a battery of eight bins for aging. The lime putty is then reclaimed by pumps and an 18-in. belt conveyor and delivered to the loading out point. This consists of a three-compartment Blaw-Knox bin used for the storage of the various fine sands, a weigh batcher, and a paddle type mixer. There the various materials are weighed out and mixed, thereby producing the mortar, stucco, or sanded plaster. The material is delivered in special dump trucks. Production averages 50 cu. yd. per day, although the plant has a daily capacity of about 100 cu. yd.

R. H. Wright & Son, Inc., began operations in Fort Lauderdale in 1942 and was incorporated in 1945. Wyatt B. Hodges is president; L. E. Davis, secretary-treasurer; George Ford, vice-president and general manager of the transit-mix department; E. D. Soady, vice-president and general manager of the construction department; and R. H. Wright, vice-president. Affiliate operations of the firm include the Deerfield Rock Corporation, the Hallendale Rock Corporation, the Broward Asphalt Company, and the Snyder Paving Company. The company also operates two portable ready-mix plants. Recently the firm erected a new ready-mixed concrete plant and a pre-stressed concrete products plant north of Fort Lauderdale between Pompano Beach and Deerfield Beach. Two-way radio has proved invaluable in integrating these various operations.

Rules of Thumb for Concrete

This is one of a series of N.R.M.C.A. "letters" in which certain basic fundamentals have been stated in terms of "rules of thumb" that can be easily remembered and applied almost universally. The following generalizations on factors affecting strength of concrete presuppose a given set of materials, since rules of thumb cannot take into account sudden changes in strength-producing properties of cement or in type of aggregate.

1. For concrete of a given slump and a given maximum size of aggregate, the addition of 1 sack of cement per cubic yard, within the range of typically used cement factors, will increase the 28-day compressive strength approximately 1,000 p.s.i.

2. For concrete having given proportions of dry ingredients, each increase of 1 in. in slump will be accompanied by a reduction in 28-day compressive strength of about 200 p.s.i.

3. For properly proportioned mixtures of the same slump, doubling the maximum size of aggregate (say from 3/4 to 1 1/2 in., 1 to 2 in., or 1 1/2 to 3 in.) will result in an increase in 28-day compressive strength of about 400 p.s.i.

4. For properly proportioned mixtures, comparable as to cement factor and slump, air entrainment in usual amounts will affect strength approximately as follows:

a. In lean mixtures, no effect or a slight increase in strength.

b. In mixtures of intermediate richness, a reduction in strength of 2 to 3 percent for each percent of air.

c. In rich mixtures, a reduction in strength of 4 to 5 percent for each percent of air.

Precast Step Co. Products Popular in Spokane, Seattle

Precasting of concrete porch and step slabs has been signally successful for the Precast Step Company, started in Spokane, Wash., three years ago.

A branch of the company, opened in Seattle this year, reports that similar public acceptance of the precast products has been encountered, and that 80 percent of the home builders have turned to using them on new construction, as well as for replacement of worn out steps or porches.

Montana Concrete Pipe Company, Great Falls, Mont., largest concrete pipe and block operation in the state, has added another product to its line with the installation of equipment for manufacturing standard sizes of concrete brick. According to Glen W. Schultz, manager of the firm, this expansion will provide 5,000 brick daily.

Ready-Mix, Pipe, Products Discussed At 57th A.S.T.M. Meeting in Chicago

another P&Q exclusive

CHICAGO was host to a large group of members and visitors attending the 57th annual meeting of the American Society for Testing Materials from June 13 through 18, 1954. The local committees headed

By C. E. PROUDLEY
North Carolina State Highway and Public Works Commission

by its honorary chairman, H. H. Morgan, president of the Robert W. Hunt Company, and directed actively by Dr. A. Allen Bates, vice-president of Research and Development, Portland Cement Association, as chairman, provided the many comforts and conveniences, and the relaxation enjoyed by this gathering of scientists and engineers.

This was the year for an exhibit of testing and scientific apparatus and laboratory supplies, and a photographic exhibit distinguished by photomicrography and radiography. The 59 exhibitors demonstrated everything from microscopes and spectroscopes to air conditioning and refrigeration units for laboratory purposes. The advances in supplies, laboratory equipment, and apparatus in recent years have kept pace with the electronic age.

The actions of the A.S.T.M. committees may not always be the most spectacular features of the annual meeting but to industry they are generally of great importance.

Committee Reports

The activities of Committees C-9 on Concrete and Concrete Aggregates and Committee D-4 on Road and Paving Materials are always of special interest. Committee C-9 under the chairmanship of L. W. Teller, principal highway engineer, Bureau of Public Roads, proposed a new Tentative Method of Test for Volume Change of Concrete Products which is intended to provide a routine standardized procedure for use on such products as masonry units, concrete pipe, cast stone, prisms, or sawed sections representing these products. Another tentative method of test was proposed for Potential Volume Change of Cement-Aggregate Combinations. This test measures the linear expansion

H. H. Morgan

developed by the combinations in mortar bars subjected to variations of temperature and water saturation during storage under prescribed conditions of test. The method is regarded, according to the scope stated in the proposed method, as having particular applicability to certain cement-aggregate combinations common in the central part of the United States (Oklahoma, Kansas, Nebraska, and Iowa).

Ready-Mixed Concrete

Standard Specifications for Ready-Mixed Concrete (C 94-48) has been recommended for a number of revisions to be adopted immediately upon favorable ballot by the society. Those interested in ready-mixed concrete should secure copies of the revised specifications as soon as possible. Several of the numerous revisions pertain to air-entrainment, and the paragraph on "admixtures" is revised to read as follows:

"(4) *Admixtures*—When air-entraining concrete is specified and an admixture is used to secure the desired air content, the admixture shall conform to the Tentative Specifications for Air-Entraining Admixtures for Concrete (A.S.T.M. designation C 260T). Admixtures other than those used exclusively for the entrainment of air shall not be permitted unless provided for in the contract or in the designated applicable specifications."

Later in the specification, Section 4 paragraph (a) (5) for Alternate No. 1 and paragraph (a) (4) for Alternate No. 2 will read as follows: "When air-entraining concrete is specified, the maximum and minimum limits for air content of samples taken from the transportation unit at the point of discharge (note 2)." Add the following to note 2: "The required air content may be produced by use of an air-entraining cement, an air-entraining admixture, or a combination of the two."

The officers elected to serve on Committee C-9 for the next two years are the same as for the last two years, except that Walter H. Price, head, Engineering Laboratories, United States Bureau of Reclamation, Denver, was elected to replace Chairman L. W. Teller, who requested that he be released.

Concrete Pipe

The Committee on Concrete Pipe, under the chairmanship of R. R. Litehiser, chief engineer, Ohio State Testing and Research Laboratory, Columbus, Ohio, recommended a number of revisions, principal of which pertain to reinforced concrete sewer pipe and reinforced concrete culvert pipe (C 75-52 and C 76-52 respectively), and standard specifications for concrete irrigation pipe (C 118-52). In Section 20 of the sewer and culvert pipe specifications, the revisions permit acceptance when mutually agreed upon, of pipe having internal diameter of 72 in. and less on the basis of strength and absorption of drilled cores. The cores from the barrel of the pipe shall have a diameter not less than 3½ in. and are to be secured, prepared for testing, and tested by the methods prescribed in A.S.T.M. Designation C 42, "Standard Methods of Securing, Preparing, and Testing Specimens from Hardened Concrete for Compressive and Flexural Tests". When the cores cut from a section of pipe meet the strength test requirements, the core-holes shall be plugged and sealed by the manufacturer in such a manner that the pipe section will meet all of the test requirements of the specification, after which the pipe

section is considered satisfactory for use.

In Section 31 the footnote (a) of Table I is to have the following sentence added: "Where two lines of circular steel are specified, the inner cage shall contain not less than 50 percent nor more than 60 percent of the total area of steel listed above for each size of pipe."

The Standard Specifications for Concrete Irrigation Pipe C118-52 will have a footnote added to Section 5 as follows:

'Where alkali or sulphates are present, sulphate-resistant cement shall be used in manufacturing, and the maximum allowable absorption shall be 5 percent."

New pipe sizes and test requirements are added in Table I of C118-52 to include internal diameters of 4 and 5 in., the 5-in. size being noted as obtainable in some localities. Both sizes have a minimum shell thickness of ¾ in., an internal hydrostatic pressure on individual sections of 75 p.s.i., minimum 3-edge-bearing load 1,000 lb. per linear foot, and maximum absorption 8 percent.

Masonry Units and Mortars

A new Tentative Specification for Brick-Block Units Made From Clay or Shale, has been recommended for publication by Committee C-15 on Manufactured Masonry Units under the Chairmanship of J. E. Whittemore, Dean of Engineering, Virginia Polytechnic Institute. These specifications cover structural clay brick-block, made from clay or shale and burned, intended for use in load-bearing or non-load-bearing brick masonry. Three grades of brick-block are covered: grade SWB for use where a high degree of resistance to frost action is desired, as in foundation courses and retaining walls in northern states; grade MWB for exposure to temperatures below freezing but unlikely to be permeated with water as, for example, in the face of a wall above ground; and grade NWB for use as back-up or interior masonry. Physical requirements include compressive strength, maximum water absorption by 5-hour boiling and maximum saturation coefficient.

Committee C-15 also recommends a Tentative Revision of Standard Methods of Sampling and Testing Concrete Masonry Units (C 140-52) pertaining to preparation of units for test by capping with cement-gypsum capping material and also sulphur-filler capping consisting of a mixture of 40 to 60 percent sulphur (by weight), the remainder being ground fire clay or other suitable inert material passing a number 100 sieve, with or without a plasticizer.

W. J. McCoy

A Subcommittee of Committee C-3 on Chemical-Resistant Mortars has agreed upon a method for determining bond strength between chemical-resistant mortars and chemical-resistant brick. The test method is being published and recommended for adoption.

It is interesting to note that among the activities of Committee C-12 on Mortars for Unit Masonry, Subcommittee II on Research (Dr. F. O. Anderegg, chairman) is actively studying the subject of pointing mortars and tests for the subjective properties involved in workability and plasticity. The subcommittee is also considering reinforced brick masonry and provision of properties to secure more wall strength by giving adequate attention to the factor of area of contact.

Thermal insulating materials specifications have been augmented by the approval through the Administrative Committee on Standards of the following tentative specifications for:

85 percent Magnesia Thermal Block Insulation (C 319-53T),

85 percent Magnesia Thermal Pipe Insulation (C 320-53T),

Diatomaceous Earth Thermal Block Insulation (C 333-54T), and

Diatomaceous Earth Thermal Pipe Insulation (C 334-54T).

It has also been proposed that tentative specifications be accepted for:

Cellular Glass Insulating Block,

Calcium Silicate Thermal Block Insulation, and

Calcium Silicate Thermal Pipe Insulation.

The Committee C-16, under the chairmanship of E. R. Queer, Pennsylvania State College, recommended that Tentative Methods of Test for Water Vapor Permeability of Sheet Materials Used in Connection With Thermal Insulation (C 214-48T) be withdrawn since the same method is covered in the Tentative Methods of Test for Measuring Water Vapor Transmission of Materials in Sheet Form (E 96-53T).

Portland Cement Concrete

At one of the sessions on the significance of tests of concrete presided over by L. E. Gregg, associate research engineer, Highway Materials Research Laboratory, Kentucky State Highway Department, the effect of mixing and curing water for concrete was discussed by W. J. McCoy, director of research, Lehigh Portland Cement Company, Allentown, Pa. He observed that potability is no criterion and referred to tests by D. A. Abrams reported by the Portland Cement Association a number of years ago. Seawater, except where it is to be used for reinforced concrete, is non-injurious to concrete and results in only a slight reduction in strength. Algae in concentrations of less than 0.23 percent have a pronounced effect and may reduce the compressive strength at 28 days by as much as 50 percent and increase the air content from 2.2 to 10.6 percent. Water used for curing may have the undesirable effect of staining the concrete or attacking it aggressively. It was remarked that, in general, if water is satisfactory for mixing, it is satisfactory for curing. Iron is the principal staining element, and organic impurities in the water are the aggressive attackers. It has been found that as little as 0.04 p.p.m. will stain concrete, although there is no proportional relationship between the amount of iron and the degree of staining. The only satisfactory method for determination is to make a performance test.

W. L. Price, Bureau of Reclamation, in a brief discussion called attention to the fact that sulphate water has but slight effect upon the characteristics of concrete when used as mixing water but is definitely objectionable for curing.

In the absence of H. S. Meissner, research engineer, U. S. Bureau of Reclamation, Denver, his paper on *Significance of Tests and Properties of Mineral Admixtures* was presented by W. L. Price. The admixtures referred to did not include the chemicals. Powered admixtures, it was advised, should be used only when

the adverse effects are outweighed by the advantages resulting from their addition. Benefits usually are to the characteristics of workability, heat reduction, and volume change. In his discussion of the paper Bryant Mather, engineer, Concrete Research Division, Waterways Experiment Station, Jackson, Miss., recommended the addition of the factor of economy in mass concrete work as one of the benefits to be derived by the use of certain powered admixtures.

C. E. Wuerpel, technical director, Marquette Cement Manufacturing Company, Chicago, one of the pioneers in the use of air-entrained concrete, presented a paper on *Air-Entraining Admixtures*. He summarized the occurrence of purposely entrained air in concrete and reviewed the factors which affect the amount of air entrained. He observed that a reduction of the percentage of entrained air due to pressure may be helpful in improving the durability of concrete instead of reducing the effectiveness which might be expected in concrete of a lower percentage of entrained air.

The setting time of concrete has been a problem of interest to students of concrete for many years. This problem was the subject of a paper by Dr. E. W. Scripture Jr., The Master Builders Company, Cleveland. In the absence of Dr. Scripture, S. W. Benedict, director of research, Master Builders Research Laboratories, Cleveland, reviewed the paper, which pointed out that the behavior of cement in paste or mortar may be entirely unrelated to that in concrete, due to the character of the coarse aggregate. Admixtures can affect setting time as well as other physical characteristics of a concrete mix. No method of measuring the setting time of concrete has been evolved; but among the suggested methods is the electrical resistance which is good under some circumstances for plain concrete in which there are no admixtures. The consistency method has a range which is too narrow for practical use, although the Kelley-ball indicates some promise. A bleeding test is not feasible, and volume change or shrinkage is not a definite indication of setting time. The most promising method is the sonic or velocity-of-wave transmission method but it is obviously too technical for general use. Deformation tests such as might be conducted through the use of an air meter may prove to be a useful temporary substitute for want of anything better.

In the session on concrete and

C. E. Wuerpel

cementitious materials at which Dr. A. Allan Bates of the Portland Cement Association presided, L. John Minnick of G. & W. H. Corson, Incorporated, Plymouth Meeting, Pa., reviewed the results of a number of investigations on the use of fly ash as a pozzolanic material and as an admixture in portland cement concrete.

Tests secured through work done by subcommittees of A.S.T.M. Committees C-1 and C-9, the Corps of Engineers, U. S. Army, and the Bureau of Reclamation were reviewed. Certain observations were made in connection with the data to the effect that the results when plotted show poor correlation between the variables being considered. Nevertheless, graphs of the results answer

Dr. E. W. Scripture Jr.

questions that have been raised. The differences obtained on various materials were primarily those of degree, with no sharp demarcation between so-called unsatisfactory and satisfactory materials. No single property of fly ash seems to be usable as a basis of evaluation, and it is necessary to consider each individual property in the light of all others. There are many unanswered questions that still face the engineer in connection with the use of fly ash in concrete, according to Mr. Minnick, just as there are many unanswered questions in connection with concrete itself. Some of these problems are perplexing and difficult and will be resolved only through many years of research and experience.

The relationship between the cylinder, modified cube, and beam strength of plain concrete has been studied statistically by Clyde E. Kesler, associate professor of theoretical and applied mechanics, University of Illinois, for concrete having varying strengths and made from different mixes. The aggregates used were the same for all specimens. The results presented are based on over 1,400 individual static tests involving concrete of different strengths and ages. Beams having a 6- by 6-in. cross-section were tested on two different span lengths, 60 and 18 in. Modified cube tests were conducted on the broken pieces obtained from these beam tests. Cylinders tested were standard 6 by 12 in. in size.

From the information presented, the following conclusions were drawn:

"1. The modulus of rupture obtained from tests on a beam having a span of 18 in. and loaded at the third points does not vary significantly from that obtained from tests on a beam having a span of 60 in. and loaded at the third points.

"2. The mean value of the modulus of rupture varies from about 22 percent of the mean value of the cylinder compressive strength for the low-strength concrete to about 12 percent for the high-strength concrete. The standard error of estimate of the modulus of rupture is 75 p.s.i.

"3. The mean value of the cylinder strength varies from 7.5 times the modulus of rupture for the low-strength to 6.5 times for the high-strength concrete. The standard error of estimate of the cylinder strength is 630 p.s.i.

"4. The mean value of the modulus of rupture varies from about 18 percent of the mean value of the

(Continued on page 167)

OHIO R.M.C. ASSOCIATION Streamlines Annual Summer Meeting

another ON THE SPOT report

THE 16th annual meeting of the Ohio Ready Mixed Concrete Association, held at the Hotel Cleveland, Cleveland, Ohio, on June 15-16, brought out over 100 members, associate members and others to the one-

By ROY L. PECK

day, streamlined meeting, to hear the reports of various committees and three meaty addresses on up-to-the-minute subjects.

Cost Accounting in Ready Mixed Concrete was the subject of an unusually interesting paper by Ed Pitzer. fleet superintendent, Hilltop Building Materials, Inc., Cincinnati, Ohio, in which he went into great detail on maintenance and delivery costs on the 100 ready-mix trucks operated by his company. Pertinent data collected by drivers and other personnel is placed on one of seven different forms shown by Mr. Pitzer; these card forms are then collected daily and the data they contain is entered on two types of unit record cards forming the basis of comparison on cost-per-yard for guiding management in the purchase of equipment. In the collection of this data the paper work has been reduced to the minimum, always a desirable feature in gathering necessary information.

The address *Radio in Ready Mix* by J. A. Nicholson, past president of the association, compared costs of leased and owned equipment, the former type usually available from the Bell Telephone Company on a five-year guaranteed agreement. A daily operating cost of $1.00 per day per truck, with a net daily saving on each installation of around $1.75, was cited by Mr. Nicholson as average performance. Among the advantages accruing to the operator using radio in his truck units, he touched on the following: better control over deliveries; closer knowledge of customer's needs; a more accurate knowledge of job conditions and possible causes of delay; and elimination of the usual waiting time at the end of the day for operating personnel, who would, lacking radio information, be compelled to await the return of trucks to the plants.

Mr. Nicholson pointed out his own company's favorable experience with radio, and presented many reasons why this modern tool is a "must," especially for the larger operators in those cities where radio use is not hampered by regulations limiting its application to specified jobs. He urged that all producers of concrete check up as to any possible local limitations, then visit any neighboring plant where radio is utilized and become convinced at first hand of its value in any individual operation.

● Officers and directors elected for 1954-55: L. A. Kemter, Goff-Kirby Co., director; Ralph Anderson, Anderson Concrete Corp., treasurer; C. O. Dittrich, Hilltop Building Materials, vice-president; C. F. Schoaff, The J. P. Loomis Coal & Supply Co., president; R. L. Collins, president, N.R.M.C.A.; Claude Clark, secretary; and Herb Rusk, Ready Mixed Concrete, Inc., director. Standing (all directors): J. A. Nicholson, Nicholson Concrete (immediate past-president); J. T. Muller, Boardman Supply Co.; E. E. Osborn, Clinton Construction Co.; Roger Slugg, Hamilton Gravel Co.; G. J. Frye, Dayton Builders Conc. Co.; Stephen Stepanian, Arrow Sand & Gravel Co.; and Harry M. Graff, Portsmouth Mixed Concrete Co.

Selling Ready-Mixed Concrete—A Challenge, was the subject of a most interesting paper by R. C. Collins, The Warner Company, Philadelphia, and president of the National Ready Mixed Concrete Association. In this paper, facts of value to every ready-mixed concrete producer were set forth in their proper importance in successfully selling today's tightening market in concrete. Citing a 53,000,000-cu. yd. production using 71,000,000 bbl. of cement in 1953, Mr. Collins warned that even with this apparent approval of the material, there would still be found a few technically inclined professional engineers who preferred job-mixed concrete today. However, he pointed out that these exceptions had been brought about by a few unfortunate experiences of price competition dictating a cheapening of the quality of the concrete. He warned his audience to place less importance on price today and to pay more attention to selling the value of ready-mixed concrete to their customers, pointing out that the customer seldom places price as the most important factor in deciding to buy, and in fact, has listed it behind guaranteed delivery promises, quality, readiness, etc., in several tabulated opinions publicized lately. Producers of ready-mixed concrete should foster better customer relations and avoid, above all, allowing misunderstandings to fester into real difficulties.

Mr. Collins mentioned the possibility of a form of price control again being placed on industry in the event of a war, and stated that these are now being readied for immediate application in certain lines. This possibility of having one's prices frozen as of a certain date can be largely minimized by the use of sales agreement forms, especially protecting the purchases of cement wherever possible. As for a possible cement shortage in the offing, Mr. Collins feels that despite the large commitments for vast mileages of toll-roads, freeways, etc., planned for, sufficient cement will be made available for concrete producers in most areas. He briefed some of the endeavors of the committees of the N.R.M.C.A., in this 25th anniversary of its founding and promised full co-operation of its functioning where this would specifically help the various state ready-mixed associations in work they are undertaking.

J. A. Nicholson, outgoing president of the association, reviewed the last year in his opening speech. He reported that membership had increased from 92 to 111 producing members and from 23 to 29 associ-

ate members. He said that the three standing committees on labor relations, cement, and specifications should, in his opinion, be augmented by an additional standing committee on promotion. He cited the possible inroads made into ready-mixed concrete production by pre-stressed concrete, black-top surfacings on an ever-increasing number of driveway installations, and precast concrete units in wall slabs and floor slabs.

Ralph H. Anderson, treasurer of the association, and president of the Anderson Concrete Corporation, Columbus, in presenting financial details of the prior year, suggested that special effort be made by all members toward increasing the membership, so that a greater working capital can permit of more outside contact with similar groups.

Claude L. Clark, in making his 16th consecutive annual report as secretary, described several meetings of the board and committees during the last year, praised the good effect of the short courses co-sponsored by the association and the University of Cincinnati in January, and urged that more operating personnel of the members be sent to the courses planned to be held at Ohio State University next February. He said that 151 members of the Ohio association had attended the N.R.M.C.A. annual Chicago meeting in February; that many were members of both groups.

Mr. Clark stated that this year's program had been built around the theme that since the country has returned to normal competition, sound management calls for maximum economy in operation and that each company's survival in this competitive environment necessitates reduction in cost of operation, increasing sales and more effective production and distribution methods. He called attention to pending legislation in both the national as well as the Ohio legislatures. These measures concern higher vehicle licenses, higher payments for unemployment compensation, etc. Mr. Clark urged attention to the need of the membership fighting actively any adverse legislation which might be considered. He pointed to the item of $173,000,000 for some 153 new school buildings in Ohio as representative of the bond issues being offered on construction especially applicable to ready-mixed concrete. He stated that it is believed the volume of construction in Ohio in 1954 will be about the same as that of 1953, with considerable differences in types of work.

R. P. Mumford, of Springfield, Ohio, gave his report of the specification standing committee, emphasizing that this committee is a sort of liaison between the concrete producers and the various architectural or engineering groups preparing concrete specifications, either on private or public work. He felt that his year's experience with the group has almost convinced him that there are many such technical officials who are not acquainted with A.S.T.M. Specification C-94 covering concrete preparation, and declared that he would like to see a copy of such applicable specifications put into all such offices. He reported real progress had been made with the Ohio state officials and highway departments in allowing committee members to sit in on contemplated amendments on the use of concrete by state agencies.

Carl F. Shoaff, J. P. Loomis Coal & Supply Company, Akron, Ohio, who has acted as vice-president of the Ohio group and who was elected to be the incoming president, reported on the activities of the standing committee on labor relations, stating that several meetings had been held in the course of the year with discussions on hourly rates on drivers varying with different size truck units, with union pattern requests, types of contracts, and welfare plans, etc.

Mr. Mumford read the report of the standing committee on the short course held at the University of Cincinnati, for which 16 instructors had been recruited from various agencies such as the P.C.A., N.R.M.C.A., and Corps of Engineers, and in which 134 had registered over the three-day period. He strongly urged attendance at the next course, to be held at Ohio State University, February 7-8, 1955.

The following officers were elected as nominated: Carl F. Shoaff, Akron, president; Charles P. Dittrich, Cincinnati, vice-president; Ralph H. Anderson, Columbus, treasurer; and Claude L. Clark, secretary. Directors elected for a three-year term were: J. A. Nicholson, Toledo; E. E. Osborn, Clinton Construction Company, Wilmington; and Robert H. Slugg, Hamilton Gravel Company, Hamilton. John T. Muller, Youngstown, was elected for the three-year term left vacant by the election of Charles P. Dittrich as vice-president.

A.S.T.M. Meeting

(From page 165)

modified cube strength for the low-strength concrete to about 12 percent for the high-strength concrete. The standard error of estimate of the modulus of rupture is 75 p.s.i.

"5. The standard concrete cylinder gives a compressive strength having a mean value about 80 percent of the mean value of the modified cube strength for low-strength concrete but about the same or only slightly lower strength for high-strength concrete. The standard error of estimate of the cylinder strength is 420 p.s.i.

"6. There is no significant difference between the consistency of the values from the cylinder and modified cube tests.

"It is not intended that these relationships be used to obtain quantitative values, but they are put forth only to indicate what might reasonably be expected . . . "

A rapid accelerated test for cement-aggregate reaction was described in a paper by C. H. Scholer, professor of applied mechanics, Kansas State College, and G. M. Smith, professor of engineering mechanics, University of Nebraska, which they recommend for predicting the deterioration of concrete caused by cement-aggregate reaction. A period of 90 days from the time of casting specimens was suggested to discriminate between concretes having undesirable expansion and those having little or no expansion. The reaction, as referred to in their paper, is not restricted to alkali-aggregate reaction but refers to the physical and perhaps chemical reactions, or a combination of both, which caused the expansion that is usually accompanied by "map cracking". To substantiate the merit of the test which consisted of 45-minute cycles of change in temperature from 68 deg. to 130 deg. to 68 deg. F. of water flowing over the surface of the beams, data are presented showing the close correlation between the relative expansion of concretes subjected to wetting and drying cycles which consumed 24 hours for each cycle—a much longer test cycle—with field service performance.

Masonry cracking and damage caused by moisture expansion of structural clay tile was covered by J. W. McBurney, consultant on masonry and masonry materials, National Bureau of Standards. Among observations made as a result of his studies, one was to the effect that from available field reports moisture expansion, indicated by continued cracking, is still occurring after 12 years of exposure.

Rx Ready Mix

By Harry F. Thomson

Correct Test Procedure Is Important—Part II

ALMOST every deviation from the standard test procedure results in an indicated compression strength which is lower than it would have been if the proper routine had been followed. Many laboratories do follow the prescribed methods scrupulously; but there are enough instances of poor performance by laboratories — or possibly individual representatives—to pose a serious problem to the ready-mix industry. While we are in no wise attempting to indict the testing fraternity, the following are typical experiences of inadequate procedure which are much too common in this field:

1. One of the most prevalent offenses is the failure to deliver specimens to the laboratory for standard curing after 24 hours, *i.e.* the day after casting, which is prescribed in A.S.T.M standard C-31. At the laboratory it may be explained that the volume of testing does not justify operating a truck for such pick-ups. The result is that the specimens are left on the job until some representative is driving in the vicinity and finds it convenient to take the cylinders to the laboratory. Thus the specimens may arrive at the laboratory after 2 to 6 or more days at the job, under unknown conditions. A low-strength report may subject the producer to severe criticism, although such a test is not a proper measure of the quality of the concrete delivered.

2. On a small school job involving government money, the 28-day strength of foundation concrete placed in the late fall was reported as 800 p.s.i. The inspector shut the job down and ordered the foundation removed. The contractor protested, and offered to have a chunk removed from the wall, cored, and tested. After two men had chipped away for two days to remove a square foot of the wall without breaking out the chunk, the inspector was convinced that the concrete in place was o.k. and allowed the job to proceed. Subsequent examination of the crushed original cylinders showed clear evidence of frozen crystals, but the laboratory report had merely stated the crushing strength, and no effort was made to identify the cause of the low break.

3. On a railroad job for which strength concrete was specified the railroad's inspector made specimens by holding the cylinder mold in the stream of concrete delivered by the ready-mix truck, without any rodding, and then jolted the cylinder two or three times on a nearby rail. When a representative of the ready-mix company protested that this procedure was not as specified by A.S.T.M., the inspector remarked that the specimen had "received better compaction than the concrete as placed on the job." As this remark indicated a total lack of understanding of the intent that the specimen was made to measure the quality of the concrete as delivered, the matter was brought to the attention of the division engineer, who quickly gave instructions to follow the standard procedure.

4. Strengths reported on deliveries to a large industrial job showed a sudden drop. Investigation showed that the low-strength cylinders had stood, while at the job, on ground which "shivered" from the vibration of nearby street and railroad traffic. When subsequent cylinders from the same mix proportions were stored on firm ground a short distance from the point of placement, the reported strengths were again normal.

5. A highway department inspector insisted that the discharge gate of a truck-mixer could be opened only slightly to control the flow, instead of controlling the drum speed; and then he complained that the material discharged at the end of the load was too stony and short of mortar. Of course, he had merely sieved the aggregate from the mortar. This could not have happened with later open-end drums. But that type of inspector might have required, as one did on another job, that a 4½-cu. yd. ready-mix drum should revolve at 20 r.p.m., the same as a 1-cu. yd. building mixer on his previous job; he overlooked the recommendation of truck-mixer standards that the top peripheral speed of a drum be approximately 225 f.p.m.

6. A report on three cylinders from a wall pour showed such low strengths that the out-of-town architect promptly instructed the contractor to change his source of concrete supply in spite of a previous record of good strengths on this job. Investigation showed that on the day the low cylinders were cast the commercial laboratory inspector did not reach the job until some time after the wall pour was finished. The inspector proceeded to scoop material from the top of the wall, including laitance, water-gain, and some concrete, and used that "soup" to cast the test cylinders. Manifestly those specimens were not representative of the concrete delivered at the job. However, no explanation to this effect appeared on the report, and the ready-mix producer was left with the onus of proving that the concrete in the wall was fully up to specifications.

Further examples of downright malfeasance in making or handling concrete specimens could be cited almost without end. The fact is that many ready-mix producers have had unfortunate experiences from poor testing. Although the producer may not employ the laboratory, he can aid his own position by being familiar with the A.S.T.M. standard methods of concrete tests, and calling attention to improper procedure whenever noted.

Apparently there are three factors which may contribute to such situations. The first is ignorance, which is inexcusable. Commercial laboratory technicians claiming to be competent should know the details of standard test methods; their test report implies, even if not stated specifically, that the respective standards were followed in making the test. Sometimes the inspector is incompetent, which is still the responsibility of the laboratory, although the claim has been heard that the rates paid for testing are too low to support employment of fully qualified inspectors.* It appears likely that

* A *Manual of Concrete*, published by the American Concrete Institute, contains an excellent outline of the work of an inspector. A new edition revised and amplified by the sponsoring committee, is expected to appear soon.

competition among commercial laboratories has resulted in some areas in reducing the quality of service inspecting and testing to an unsatisfactory level.

A third source of poor test reports is the practice of many laboratories to omit essential information, particularly the name of the person who made the test cylinders, and a description of the experience of the cylinders (moisture, temperature, etc.) during the period the specimens remained on the job. The experience information is especially important for cylinders tested at three to seven days. If cylinders reach the laboratory without this information, the report should state "unknown", which would be only fair to the concrete producer in case of low strengths. However, many laboratory technicians are reluctant (and some even refuse) to include full information or to state "unknown" on the report; they consider that doing so might reflect a shortcoming on the part of the contractor whose representative made the cylinders and who is the employer of the testing laboratory.

It has been suggested that the present general practice on commercial work of requiring the contractor to furnish the inspection and testing service is not producing fully reliable results. If the contractor pays for the testing, he is inclined to buy such service as cheaply as possible, regardless of the quality of service performed. It would appear more realistic to have the laboratory employed by the engineer or architect. The laboratory would then be representing the interest of the owner. On some large commercial jobs the engineering organization includes inspectors who make the cylinders and arrange for the testing. This arrangement—having the laboratory representing the owner instead of the contractor—could well be extended to smaller work on which the laboratory furnishes the inspectors.

In the long run, the ready-mix producer is justified in being vigilant that his reputation is determined by the real quality of his product instead of by inadequate inspection and improper testing.

Ray Melville, president of the Wisconsin Valley Concrete Products Company, Wisconsin Rapids, Wis., was one of four businessmen killed in the crash of a single-motored private plane near the Atlanta, Ga., municipal airport recently.

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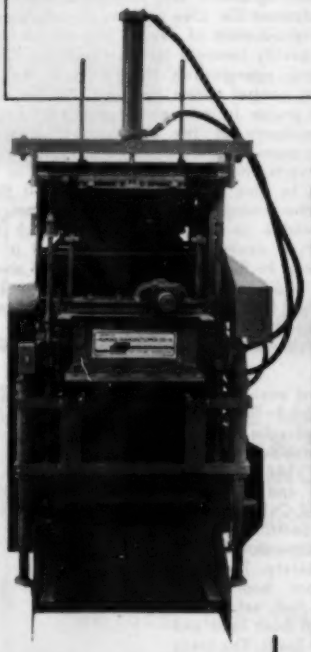

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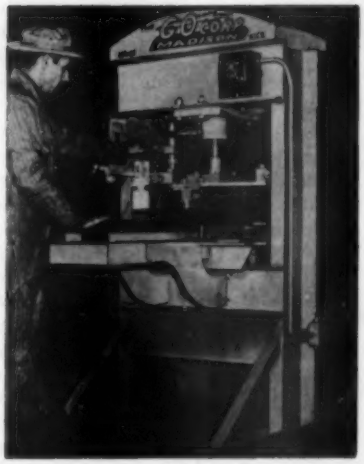
● Machine-cast water meter boxes come from Columbia Machine's new combination tile-and-block machine at a rate of 3-4 per minute. The special mold makes them with flared top and rounded lip. Several other molds have been perfected to make other specialties in the 12-in. high unit. One turns out 36 Roman tile every 16 seconds on a three-block machine. Conventional masonry units are made in addition to the specialties. (101)

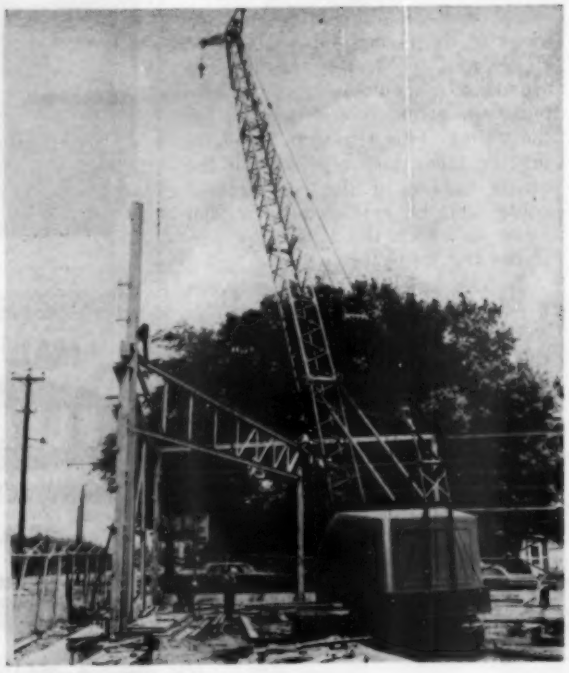


● Block 8-in. high and 18-in. long and wide can be split at a rate of 20 cycles per minute on this GeCorp-Madison block splitter introduced by the Gene Olsen Co. It splits straight or at an angle, weighs 1600-lbs., has a 2-hp motor and hydraulic cylinders developing 30,000-lb. pressure. (102)

● Rapid on-the-job tests of concrete can be made with laboratory accuracy, Soiltest, Inc. says, announcing its new portable testing machine. Self-contained and hand-operated, the 200,000 lb. capacity unit develops its load by hand pump. It has a direct reading guage and a maximum load pointer. Standard 6-in. diameter cylinders 12-in. high are accomodated. A flexure attachment permits rapid conversion to a 20,000 lb. beam testing machine. (104)

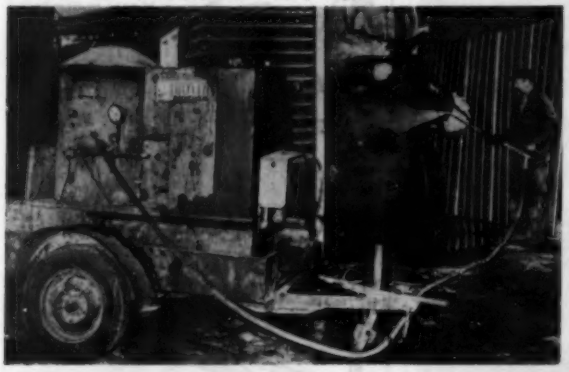
● Better concrete and less guesswork result from using the Tel-A-Slump slump measuring device, says Imperial Construction Equipment Co. One unit has already guided the production of over a half-million yards of quality concrete in one plant. The Tel-A-Slump operates on the principle that, in most central mixers, the load on the electric motor is inversely proportional to the consistency of the concrete. It measures the power requirements of the motor and converts this into inches of slump in the mix to give an exact reading at all times in the mixing cycle. A recording device is available to maintain batch-by-batch records if desired. A calibration chart is furnished to fill in all size mixes for all slumps in addition to the dial calibration (furnished for 2, 4, 6 and 8-in.) for the rated capacity of the mixer or whatever size batch the owner desires. (103)→

● First one-yard shovel-crane to have power hydraulic control, this Link-Belt Speeder LS-98 has an 80-ft. boom and 15-ft. jib. Speed-O-Matic controls contribute greatly to operator comfort and safety. The independent boom hoist allow fast, safe handling of both light and heavy loads. The crane is built in three models — crawler and truck-mounted and the self-propelled Zephyr-crane. (105)→



● Able to handle liquid concrete and other materials, this Kal-Truk carries a 3000 lb. load up a 25% grade. It can be changed to a platform body in two minutes to carry block, lintels, etc. It runs all day on a tank of gas and will do 15 mph. ←(106)

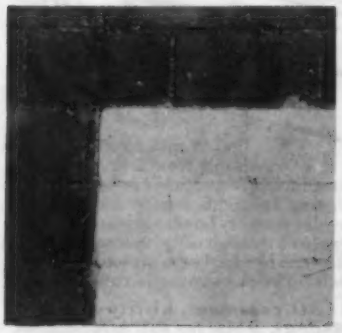
● William B. Thornton, vice president and general manager, Manchester Sand & Gravel Company, Manchester, Conn., gives one of his ready-mix drivers delivery instructions. The International Harvester truck is powered by a 180-hp model HRBB-600 Cummins Diesel, and is equipped with an eight yard mixer. Mr. Thornton reports that this unit, as well as five other Cummins powered ready-mix trucks, average 6.1 miles per gallon of fuel. **(107)**



● Designed to handle fast and efficiently the many types of work now considered too small or restricted for profitable large machine operation, this 15-B transit crane is now being made by Bucyrus-Erie. Removable inserts extend the standard 30 ft. boom to 70 feet. Booms 60 ft. and longer with 8 or 16-part suspension can be equipped with special folding equipment for job-to-job moves. The wheel mounting, built specially for Bucyrus-Erie crane-excavator service by White-Sterling, is powered by a 138-hp gasoline engine. **(108)**

● Burns and Dutton Concrete Construction Ltd. of Calgary, Alberta, uses this Malsbary 220 steam cleaner at the batching plant for the daily cleaning of mixer trucks and other equipment and for cleaning before overhaul and repainting. It also heats water for mixer trucks after Fall temperatures go below freezing. **(109)**

● Another major improvement in Wal-Lok horizontal mortar joint reinforcing for masonry walls introduced by Adrian Peerless is the galvanizing of exposed sections of the cross bars for protection against rust. **(110)**



● A new oil-base paint for waterproofing masonry, prevents water from penetrating the blocks at the lower right, while unpainted block absorb moisture. Called Damp-Seal, it is made by The Monroe Co., and has a grit-like volcanic ash filler that fills small pores, stops capillary action. **(111)**

AUGUST 1954

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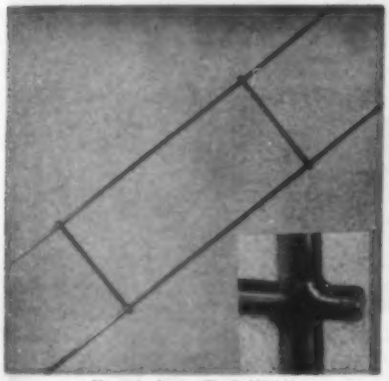

(Insert shows Flush Weld)

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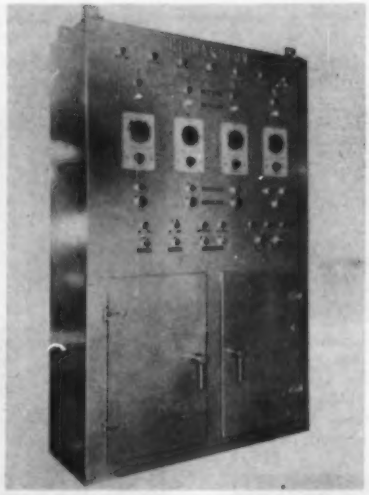

● A remote control system for automatically proportioning dry concrete mixes, developed by Richardson Scale Co., is said to be extremely accurate and fast, and to cut labor costs and permit a high degree quality control. Ingredients are fed from storage to a single automatic scale and cumulatively weighed. The formulated batches are then dropped into a mixing conveyor and sent to a storage bin prior to bagging. One man, working the panel board (above), sets up the formula and the operation proceeds and repeats itself. **(112)**

● A handy item to rent out to your block customers, this low-cost conveyor has been designed for contractors and builders by Fairfield Engineering Co. The Flare-Top conveys all building materials less than 16 in. wide, comes as a basic 24 ft. unit. **(113)**

● This combination air compressor—dump truck body unit is being produced jointly by Davey Compressor Co. and Galion All-steel Body Co. The 105 cfm Auto-Air compressor is driven by power take-off from the engine. The body is 90x78x15-in. **(114)**

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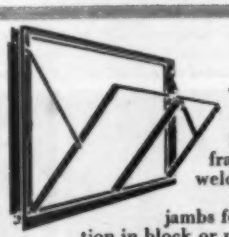

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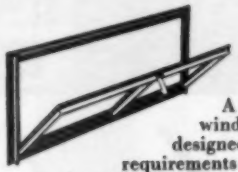

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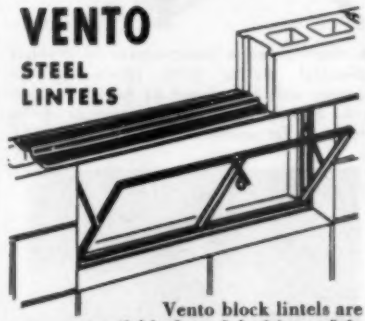
AND

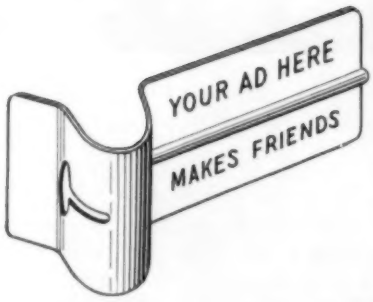
VENTO STEEL LINTELS



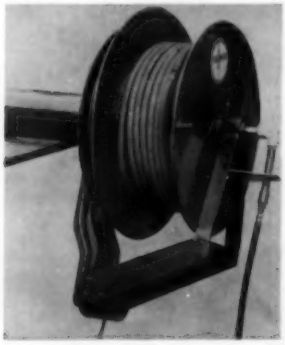
Vento block lintels are available from 2 ft. 6 in. to 5 ft. Formed from 10 gauge hot rolled steel with stiffening crimp in center. Beveled edge provides masonry bond and seat for mortar. Saves costs through use with standard 6-inch and 8-inch blocks. Vento pressed steel angle lintels for brick construction also available.

ALSO casement, utility and barn windows. Write for full information.

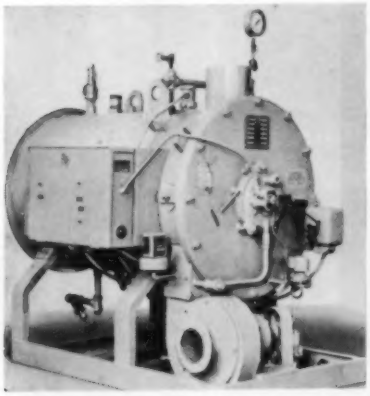
VENTO STEEL PRODUCTS CO., INC.
254 Colorado Ave. Buffalo 15, N. Y.



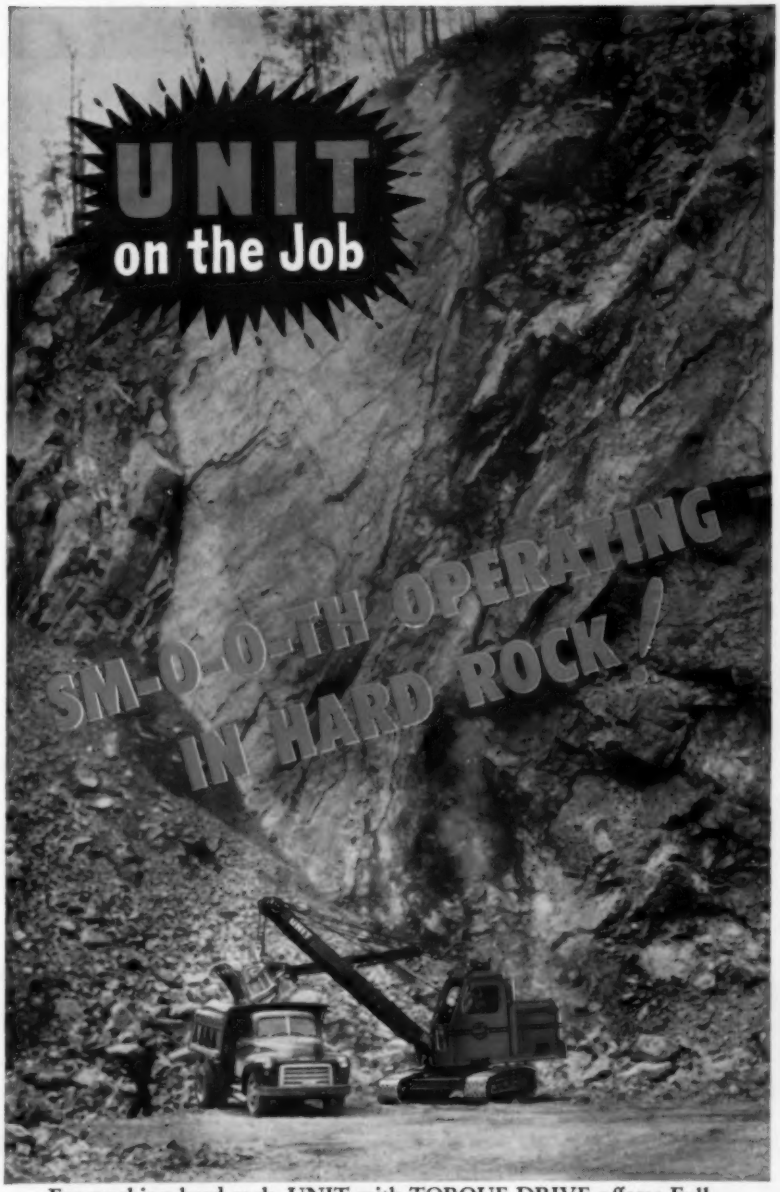
● This sturdy metal corner block, which permits one man to make line changes when erecting block walls, has been devised by Louis M. Gerson Co. as a handy remembrance item for you to give your customers. It holds the line tightly on long spans without sagging, and is said to be especially useful on short walls or veneer work. Your advertising message is stamped into the metal. **(115)**



● This combination hose reel and tagline has been introduced by McCaffrey-Ruddock to eliminate the need for having a man stand by on the ground to recharge the storage tank which actuates the air or hydraulic operated cylinder on the bucket. It steadies the concrete bucket at any angle of the boom while paying in and out the airhose, minimizing twisting and swinging. Installed in 30 minutes, it pays for itself in added safety and increased speed. **(116)**



● New pocket-size automatic package boiler units made by Ames Iron Works cut installation space (71x35-in. base, 54-in. high) and meet the need of operations requiring smaller steam capacities. The TP steam generator is available in seven sizes 15 to 60 hp, 15 to 200 lb. W.P., for firing with oil, gas or oil and gas. **(117)**

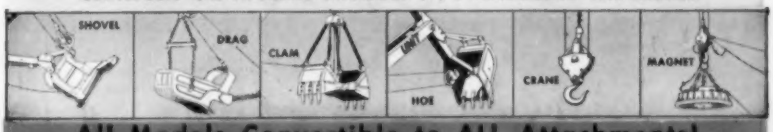


For working hard rock, UNIT with TORQUE DRIVE offers: Full, steady power without stalling engine — Increased lugging power — Elimination of shock loads on machinery. Investigate these advantages and other UNIT features. Write for Bulletin No. U-1153.

UNIT CRANE & SHOVEL CORPORATION

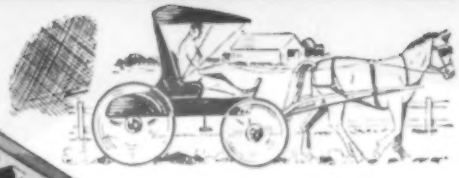
6329 WEST BURNHAM STREET • MILWAUKEE 14, WISCONSIN, U. S. A.

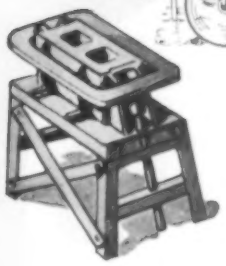
½ or ¾ YARD EXCAVATORS...CRANES UP TO 20 TONS CAPACITY
CRAWLER OR MOBILE MODELS . . . GASOLINE OR DIESEL



All Models Convertible to ALL Attachments!

The BESSER HALF-CENTURY

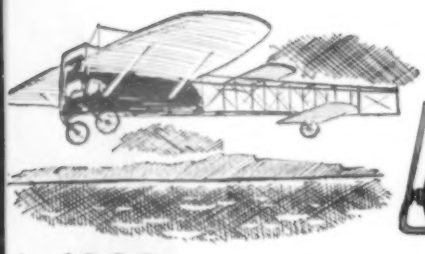




1904

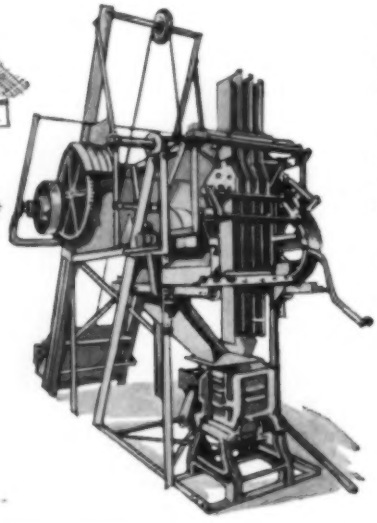
The horse and buggy was still the popular mode of transportation when the first Besser hand-tamp machine was made.

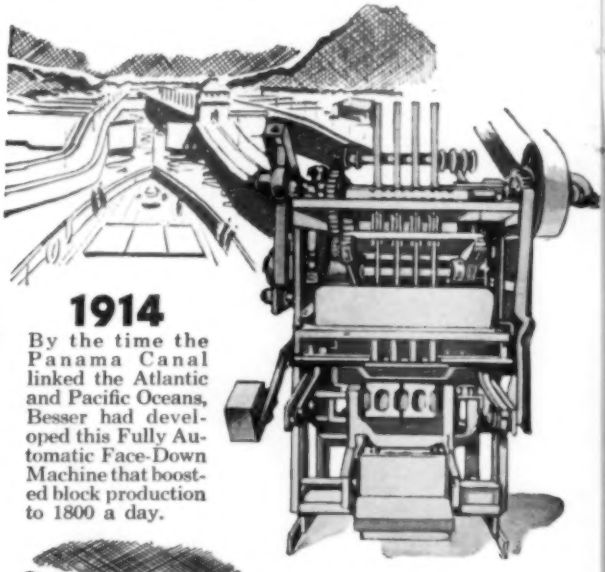
Industry has performed many "miracles" in the past half-century... and you find interesting parallels by comparing Besser achievements in concrete block machinery with some of the great steps in industrial progress. Besser has kept up front with industries setting the pace. Today's Besser VIBRAPAC represents almost inconceivable advances over earlier models that were great successes in their time. Besser achievements have produced equipment that continues to *make business good* for thousands of concrete block plants in worldwide service. Block plant operators . . . whose production topped 2-billion units in 1953... look confidently into the near future with prospects of expanding to 6-billion unit annual production. Look to Besser for continued progress... for equipment that will help you advance through years to come!



1909

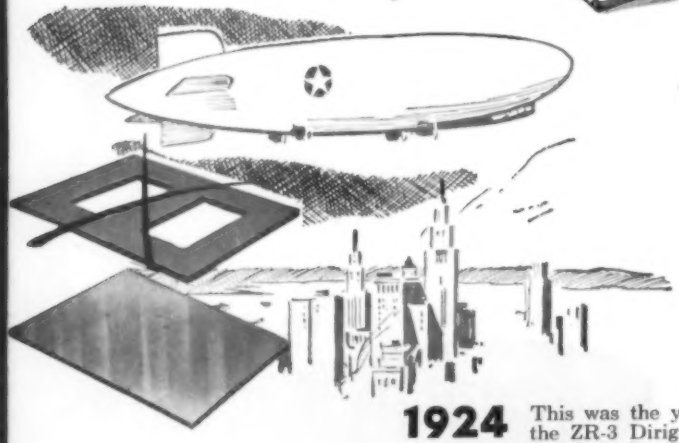
When Louis Bleriot astounded the world with the first flight over the English Channel, Besser was introducing this greatly advanced Power Tamper with skip loader.

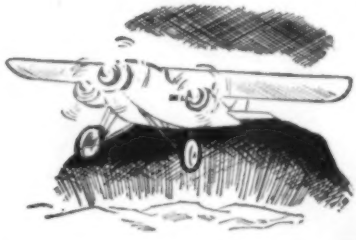


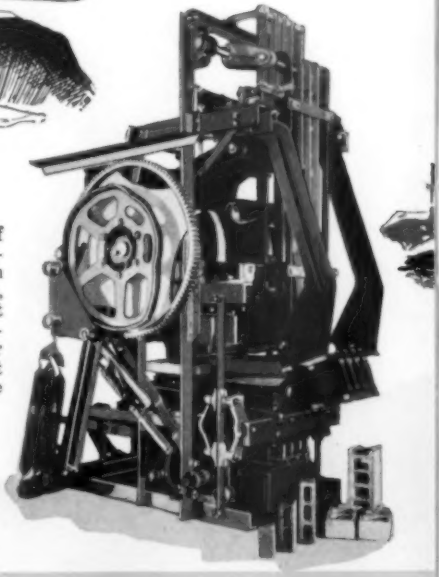


1914

By the time the Panama Canal linked the Atlantic and Pacific Oceans, Besser had developed this Fully Automatic Face-Down Machine that boosted block production to 1800 a day.







1924

This was the year the ZR-3 Dirigible flew from Germany to New York . . . the year Besser's Plain Pallet Stripper Tamper made *cored* pallets obsolete by producing *all sizes and types* of block on one set of *plain pallets*, at the rate of 3000 block a day.

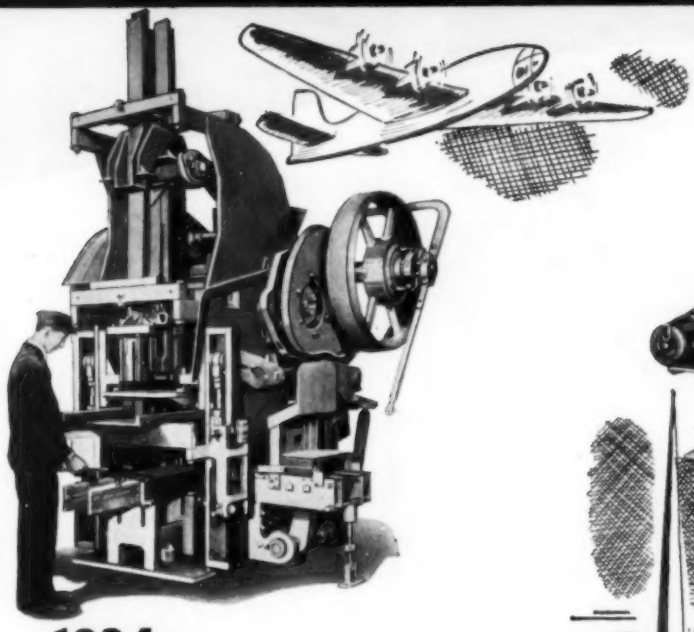
1929

During this year of Commander Richard E. Byrd's South Pole Achievements, Besser came out with the Cam Controlled Tampers for the Plain Pallet Strippers, for more positive control.

BESSER
50th Anniversary
1904-1954

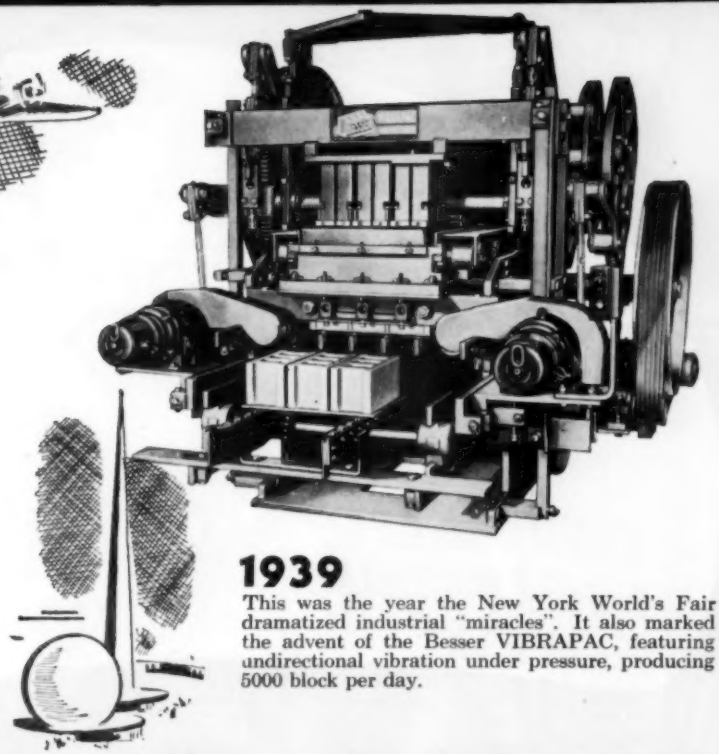
...a Half Century of Concrete Masonry Progress

RECORD OF ACHIEVEMENT



1934

Along with great advances in aircraft, came an important Besser development — the Fully Pressed Top Plain Pallet Stripper Tamper that made smoother finished block.

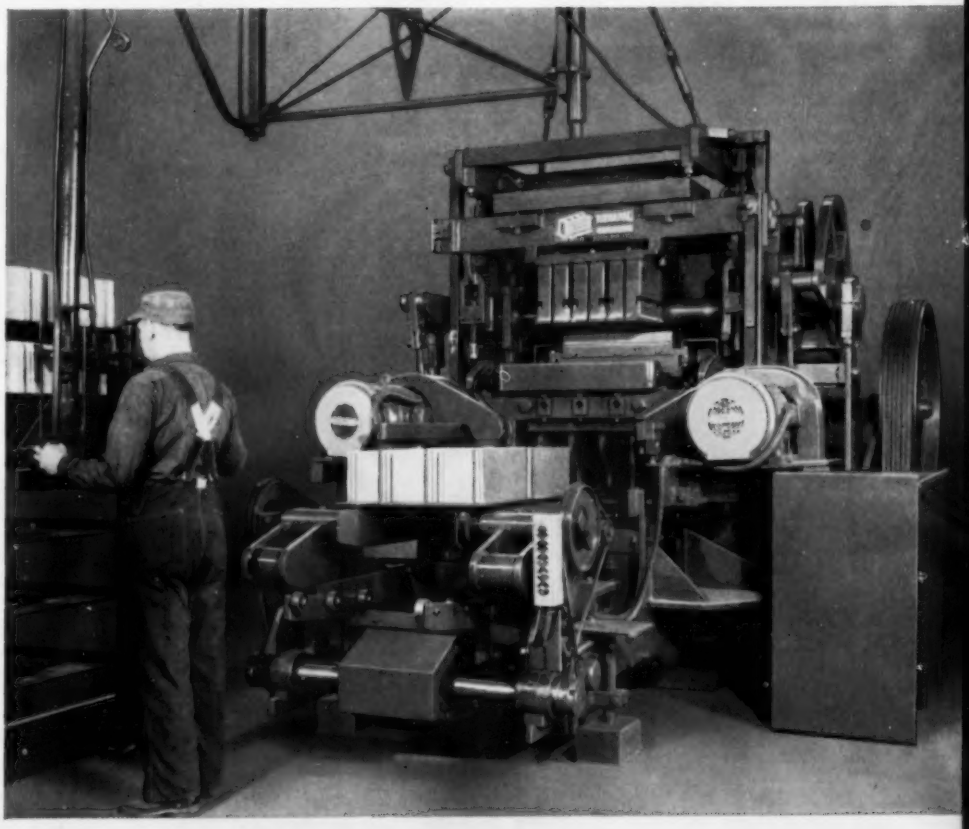


1939

This was the year the New York World's Fair dramatized industrial "miracles". It also marked the advent of the Besser VIBRAPAC, featuring undirectional vibration under pressure, producing 5000 block per day.

1954

Jet planes, atomic submarines ... and today's great Front-Pallet-Feed Besser VIBRAPAC, with Power Offbearing Hoist for making 10,000 block per day ... the peak of 50 years' progress in concrete block machinery.



BESSER MANUFACTURING COMPANY • Alpena, Michigan, U.S.A.

J-3508

Get FREE PROOF of
BETTER CONCRETE
LOWER
COST

with . . .

AD-AIRE

Meets A.S.T.M. Specifications

AIR ENTRAINING AGENT

SEND for FREE
1 GALLON TRIAL

THE AD-AIRE FORMULA blends air bubbles evenly through the mix. It's an approved method of boosting quality while cutting costs. Only about 1 oz. per sack of cement is needed.

READY-MIX PLANTS report lower material costs and greater ease in handling. AD-AIRE increases flowability for faster unloading. Because of increased workability and plasticity, customers can handle the concrete faster...there is less bleeding, less segregation and fewer requests for added water. Mixers are easier to clean. It's a concrete that stands up to freezing and thawing and better resists scaling, spalling and cracking.

CONCRETE PRODUCTS PLANTS have found AD-AIRE air entrainment gives sharper corners and cleaner edges. There is less mixing time, smoother machine operation and faster production. The improved textures and finer finishes obtained with AD-AIRE provide products with a higher quality appearance. Machine-made products are uniform despite variations in moisture content and aggregate gradation. With AD-AIRE you'll also find a reduction in culls, stripping damage and green handling.

Prove It To Yourself. Send For FREE TRIAL SAMPLE. No Obligation.

Carter-Waters Corp.
Dept. M-2, 2440 Pennway
Kansas City 8, Missouri

Gentlemen: At no obligation to me, please send free gallon can of AD-AIRE with complete information.

Name_____

Firm_____

Address_____

City_____ Zone__ State____

Vermiculite-Filled Block Wall Cuts Heat Transfer in Half

Tests made by the University of Utah recently on 8-in. concrete masonry walls showed a U value (overall coefficient of heat transfer) of 0.18 for the cores filled with loose vermiculite and 0.36 when no filling was used.

The tests were reported by the Zonolite Company, Chicago, miners and processors of vermiculite, who stated that the sample wall was built with standard 8- by 8- by 16-in. blocks using red lava aggregate, with surface painted with Cementico, a cement paint.

The company further quoted government reports which show that 75 percent of homes built before World War II and 25 percent built afterwards are either improperly insulated or not insulated at all, indicating the potential market for this type of insulation.

F. L. Partlo, formerly dean of the Michigan College of Mining and Technology, Houghton, Michigan, succeeds Dr. Warren E. Wilson as new president of the South Dakota School of Mines and Technology, Rapid City, S. D.

Ralph C. Brown has been named assistant manager and sales representative for the Western Concrete Products Company, of Bismarck, N. D.

● At Dravo Corporation's annual safety dinner recently, 44 individual awards were presented to operating divisions and units for their safety achievements during 1953. Carl B. Jansen, president of the Pittsburgh firm, is shown (center) presenting awards to C. N. Hollingsworth, general manager of Dravo-Doyle Company (left), and E. R. Hyde, manager of the South Side Plant of Keystone Division. Dravo-Doyle Company turned in the best safety performance among the corporation's independent units, while ready-mix truck drivers of the South Side plant had the best record among Keystone Division operations.

Servicised
CLEAR
Concrete Curing
Compound

2 TYPES
• WAX-RESIN
• RESIN BASE

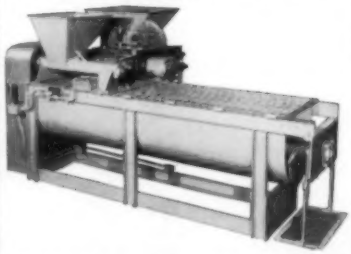
• Meet all official specifications for each particular type
• Do not alter appearance of concrete
• Dry rapidly . . . form clear, vaportight membrane

Servicised Clear Wax-Resin and Resin Base Curing Compounds are widely used for curing exposed concrete – pavement slabs, bridge structures, abutments, walls, etc. Sprayed or painted, they form a uniform moisture-retaining membrane. Available with fugitive dye to assist in proper coverage.

Write for complete details and circular on Servicised Concrete Curing Compounds.

SERVICISED PRODUCTS CORPORATION
6051 West 65th Street, Chicago, Illinois

Jones (formerly Yoder)
CONTINUOUS MIXER



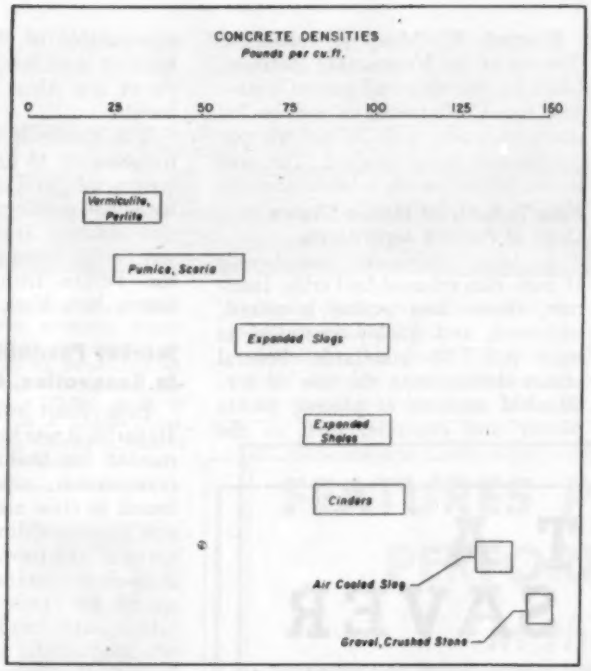
Embodies many successful new features, such as positive, non-clogging, vibrating belt feed, insuring constant volume of aggregate regardless of moisture content—no need for costly weighing equipment and moisture determinations.

Accurate proportioning through adjustable aggregate gates. Variable Speed drive for requirements ranging from 5 to 20 cu. yds. per hour. Cost only half that of batch mixer. More thorough mixing —gives up to 50% higher strength than 5-minute batch mix. Special advantages for lightweight aggregates. Illustrated literature and other information on request.

J. A. Jones CONCRETE MACHINERY
108 Horning Road, Pittsburgh 34, Pa.

● Of interest to concrete producers is this graph showing the degree to which the density of concrete varies when different types of aggregates are used. For example, perlite or vermiculite concrete weighs about 25 lb. per cu. ft., while concrete made with gravel or crushed stone may exceed 150 lb. per. cu. ft. in density.

The graph also indicates that there is considerable variation in the density of each aggregate. Expanded slags, pumice, and scoria exhibit the greatest weight variation, and gravel and crushed stone the least.



"Housing, U.S.A."—New Book Edited by Prominent Builders

A 22-chapter illustrated volume, *Housing, U.S.A.*, recently published, covers mortgage credit, U. S. housing inventory and production capacity, builder research, values of home ownership, urban development, city blight, and the slum problem.

In layman's language the story of housing is told from the viewpoint of 14 builders across the country. Published by Simmons-Boardman Corporation, New York. Price $5.00.

Add a New Profit-Maker

Increase Your Volume

PRODUCE CONCRETE JOISTS, LINTELS AND FENCE POSTS with the KIRK & BLUM HEAVY DUTY VIBRATING TABLE . . .

Your experience in the building trade should make it easy to build up a profitable business in this new line. The products are simple to make, have unusual strength, are termite proof. The KIRK & BLUM Type "S" Heavy Duty Vibrating Table is capable of multi-production of concrete joists, allowing a fine profit-margin. Easily produced by unskilled operators. For complete details and prices, write to The Kirk & Blum Mfg. Co., 3112 Forrer Street, Cincinnati 9, Ohio.

Only Small Investment Required!

The Kirk & Blum Vibrating Table requires a small initial cost, lets you make an entirely new line of 8", 10" and 12" joists in 20 and 24 ft. lengths.

KIRK and BLUM — *Manufacturers of steel forms of all types . . . Curb, Gutter, Sewer, Road*

4 EXCLUSIVE ADVANTAGES AT NO EXTRA COST WITH WAL-LOK

Masonry Wall Reinforcing Mesh

DEFORMED—Gripping qualities are increased 4.6 times over plain wire. In pull-out tests, the 3/16" dia., 100,000 psi. tensile strength longitudinal bars break, under extreme stress, rather than pull out.

KNURLED—150 indentations per foot .002" in depth grip the mortar like thousands of tiny claws. Improves bonding stress 3.2 times over plain wire.

CROSS BARS PROJECT Welded across Stretcher Rods, Cross Bars project for maximum anchorage in mortar. Cross Bars are welded over Stretcher Rods without annealing Stretcher Rods or impairing tensile strength. ***THICKNESS AT THE WELD ONLY 7/32"***

CORROSION RESISTANT Cross Bars are galvanized for lifelong durability but *only* that section which is exposed.

POSITIVE PROOF Tests conducted by the Research Foundation of the University of Toledo offer positive proof of these statements. To our knowledge, Wal-Lok is the only masonry Wall reinforcing based on scientific research.

WAL-LOK COMPLIES Wal-Lok reinforcing now complies with the recommendations of the National Bureau of Standard Bulletin 3079, Requirements for Concrete Masonry Construction (Rev. of NBS Report 2462).

WRITE TODAY for your copy of the Adrian Peerless 4-page folder on Wal-Lok. It contains the data from the Research Foundation tests, specifications, additional advantages and further information about Wal-Lok masonry wall reinforcing mesh.

ADRIAN PEERLESS, INC.

1498 E. Mich. St., Adrian, Mich.

Thin Vermiculite Wall Gets Underwriters' Highest Rating

A 4-inch vermiculite spandrel wall, fire-tested by Underwriters' Laboratory, Chicago, has been given a five-hour fire rating, highest of U.L.'s classifications. The test wall also withstood the standard 45-lb. hose stream pressure on its fire-exposed side without damage. The vermiculite concrete, a 1:4 mix, was machine-applied on paper-backed wire lath furred out from metal channels. The furnace temperatures to which the panel was subjected ranged from 1,700 deg. F. in the first hour to 2,200 deg. in the fifth hour of the test.

Edward R. Murphy, managing director of the Vermiculite Institute, Chicago, said this wall system is suitable for fire barriers, as well as for spandrel walls, with 30 pounds per square foot wind loading. The cost is competitive with other materials.

New Industrial Movie Shows Uses of Perlite Aggregate

A new 26-minute sound-color 16 mm. film released by Perlite Institute, shows how perlite is mined, processed, and quality-controlled to meet A.S.T.M. standards. Several scenes demonstrate the use of mechanical methods of placing perlite plaster and concrete, such as the construction of the perlite concrete back-up wall behind aluminum panels of the Alcoa Building in Pittsburgh.

The movie is designed primarily for showing to architects, engineers, contractors, and others familiar with technical problems in the construction industry. It is available through any of the 49 member companies of the Perlite Institute, 10 E. 40th Street, New York 16, N. Y.

Market Possibilities Seen In Renovation, Church Projects

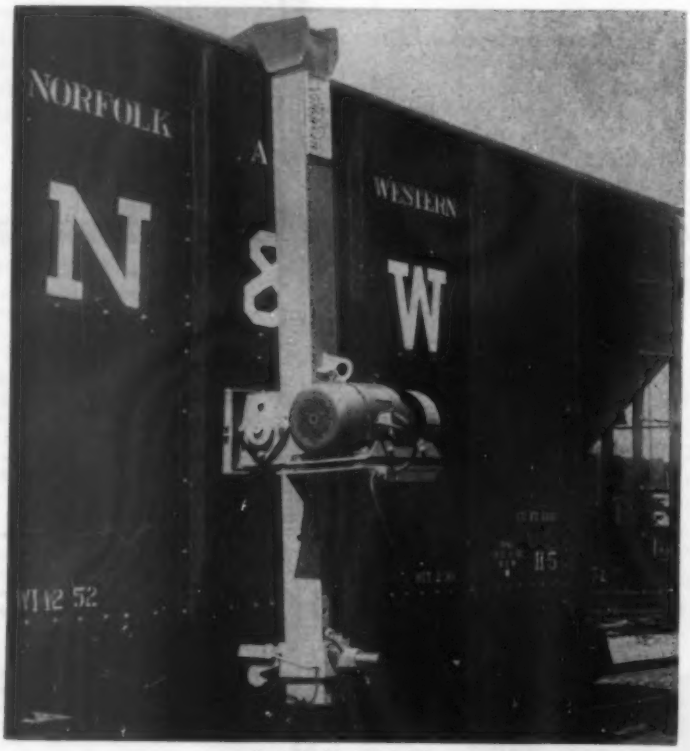
In a recent issue of the *N.C.M.A. Reporter* it was suggested that a good market for building materials and construction equipment may be found in civic and community projects for remodeling and redeveloping certain structures. Typical are the following: hospitals which are inadequate for present needs; schools which are outdated for modern teaching needs; stores which are no longer good merchandising outlets. And then there are always the old houses which have possibilities for modernization.

The *Reporter* also relayed a prediction that more money will be spent for church construction with modern design. The emphasis will be on more "human" edifices, rather than on traditional "monumental" structures.

The Builders, a new, half-hour long, color and sound film sponsored by the Wire Reinforcement Institute, Inc., Washington, D. C., relates the story of building, from its inception in the use of the three basic principles—the post and lintel, the masonry arch, and the simple truss —to the present complex but efficient systems of modern construction. Members of the Institute jointly manufacture and produce over 95 percent of the welded wire fabric used in this country for the reinforcement of concrete bridges, highways and pipe.

Questionnaires have gone out to all known ready-mixed concrete producers in the United States from the headquarters of the National Ready Mixed Concrete Association, which is assembling data for its third survey of the industry. Producers are urgently requested to co-operate with the association in its effort to present an accurate report of the ready-mixed concrete business in 1953 by filling in the report blank and mailing it to headquarters in Washington.

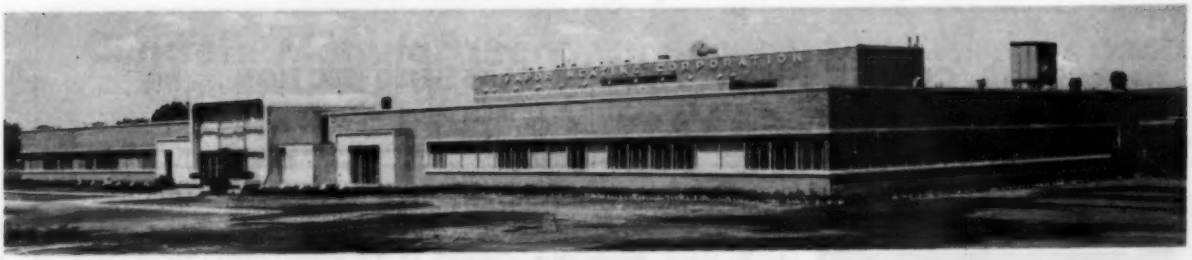
MEET A MONEY SAVER



Latest Model "C"

A NATIONAL CAR SHAKER, in service 4½ years at a ready-mix plant, has unloaded over 1 million tons of sand and gravel in all kinds of weather. Only one man has operated the shaker. Estimated savings — $23,000.

NATIONAL CONVEYOR & SUPPLY CO.
348 N. Harding Avenue
CHICAGO 24, ILL.



● The new $2,000,000 plant of Vapor Heating Corporation, which produces Vapor-Clarkson steam generators, was opened recently at Niles, Ill., during ceremonies attended by approximately 550 persons. The structure, which contains 220,000 sq. ft. of floorspace, was built on a 30-acre tract. The Roth Manufacturing Company, Vapor's subsidiary, shares the building.

V. J. Rick

Victor J. Rick has been named plant engineer and director of research at Columbia Machine, Vancouver, Wash., according to Fred Neth, president. Mr. Rick has held a similar position in the paper products division of Portco Corporation in Vancouver for the last five years.

Columbia Machine is about to complete an expansion program involving the construction of a large storage and shipping building at the rear of the present plant. The material used—naturally—is concrete block.

Mr. Neth states that Columbia's export business is holding up well, with recent sales of Model 8 machines to Mexico and Colombia, and others in negotiation.

A distributorship agreement was recently executed between Worthington Corp., Plainfield, N. J., Works and Chapman Machinery, Miami, Fla.

The Chapman Machinery Co., servicing several Florida counties, will distribute Worthington portable mixers, plaster or mortar mixers, building mixers, truck mixers, pneumatic concrete placers, and portable self-priming centrifugal pumps.

Driver of Concrete Truck Honored by Heroism Award

Floyd R. Carroll, a truck driver for the George F. Hazelwood Company, ready-mixed concrete producers of Cumberland, Md., recently was honored by the Life Saving Award of the Lumberman's Mutual Casualty Company at a special ceremony in Philadelphia.

Although his loaded truck had caught fire from faulty brakes on a steep grade in Frostburg, Md., Mr. Carroll stayed with the truck—his hair and clothing on fire—until he had guided it past several children at play, then leaped to safety. The truck was destroyed.

FEATURES *Plus*...
PERFORMANCE *Plus*...
in the New
KENTWIN Plain Pallet BLOCK MACHINE

Among many advanced features are these:

Push Button Control with automatic continuous cycling.

One Masterbox which permits using low cost interchangeable insert molds.

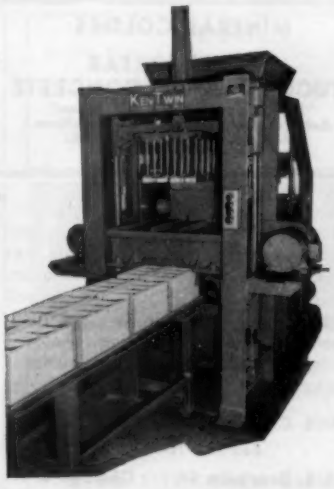
Simplified Hydraulic Operation with direct acting cylinders.

Positive Block Sizing with electric control.

Floor Level Installation.

Ruggedly Built with Anti-friction Bearings throughout.

Can be furnished with Automatic Pallet return and electro-magnetic off-bearing hoist.



Write today for complete information.

The KENT MACHINE COMPANY
CUYAHOGA FALLS, OHIO
CONCRETE PRODUCTS MACHINERY SINCE 1925
Canadian Distributor: Wettlaufer Equipment, Ltd., 49 Morton St., Toronto 12, Ontario

CONCRETE MANUFACTURER CLASSIFIED SECTION

UNBREAKABLE
PALLET RINGS
Write for full information
TEXAS FOUNDRIES
LUFKIN, TEXAS

FOR SALE—BARGAIN

2—L-5 Lith-I-Block Machines. Three block per cycle and fully automatic. Immediate delivery. Can be seen in operation at our plant. Contact:

BICKERSTAFF CONCRETE PRODUCTS COMPANY
Box 1178
Columbus, Georgia

STOP that WATER
With FORMULA NO. 640
A clear liquid which penetrates 1" or more into concrete, brick, stucco, etc., seals—holds 1250 lbs. per sq. ft. hydrostatic pressure. Cuts costs: Applies quickly — no mixing — no cleanup — no furring — no membranes. Write for technical data—free sample.
HAYNES PRODUCTS CO., OMAHA 3, NEBR.

For Sale

One good used, but very little, Homestead Hypressure steam generator. In excellent condition, complete with hoses, new coil and priced to sell $300.00. Will consider trade on portable troughing belt conveyor.

CONCRETE INC.
P.O. Box 432 Rogers, Ark.

MINERAL COLORS
for
BRICK MORTAR STUCCO-PLASTER-CONCRETE
"Fine Because of Their Fineness"
Ask for samples and recommendations.
BLUE RIDGE TALC CO., INC.
HENRY, VIRGINIA

WANTED

Leading northern Ohio building material producer and distributor has opening for experienced salesman, with engineering knowledge, to sell and promote the use of concrete products. Permanent position. Reply—giving personal, educational, business background, age and salary desired.

THE CONCRETE MANUFACTURER
Box No. H-71, c/o
431 S. Dearborn St. Chicago 5, Ill.

WANTED TO BUY

Good used BLYSTONE mixer.
5 or 6 yds.
BOX NO. E—00, c/o
THE CONCRETE MANUFACTURER
431 S. Dearborn St. Chicago 5, Ill.

SUPERINTENDENT OR MANAGER WANTED

Michigan Ready Mix Concrete Plant, one of State's largest needs fully qualified Superintendent or General Manager. Applicant must give full details of age, background, experience, salary expected or remuneration plan.

BOX No. K-91, c/o THE CONCRETE MANUFACTURER
431 S. Dearborn St., Chicago 5, Ill.

BUILD GOOD WILL

Advertising necessities for the block industry. Line Pins, Twigs, Modular Coursing Stick. Also the new Block Calculator and Wood Corner Block. All imprinted with your advertising. Complete catalog on request.

GERSON CO.
97 Dearing Road Mattapan, Mass.

FOR SALE

Sauerman Brothers 3-wheel carriage, cable saddle support for head mast, 1200 feet 1⅞" wire rope, used about one year.

DELANO GRANITE WORKS, INC.
Delano, Minnesota

MAN WANTED

To take charge of block plant in Ft. Lauderdale, Fla. Maintain two Columbia two-block machines. Permanent position. Reply, giving experience, age, and salary desired.

BROWARD BLOCK CO. INC.
So. Fed. Hy. Ft. Lauderdale, Fla.

Wanted

Used washing, screening and rushing plant either rotary or vibrating screen type. Condition not too important, but must be cheap. Would consider screening and washing plant only. Tell us what you have.

CONCRETE INC.
P.O. Box 432 Rogers, Ark.

FOR SALE

1—Osgood 200 Crane—Chrysler 8 Engine—Rigged for Clamshell 50' Boom. Excellent condition and operating every day. Price $6500.00

2—Rex Hy Discharge 3 yd. Mixers mounted on GMC Tandems. Excellent condition and operating every day. Each $2750.00

MIRACLE CONCRETE COMPANY
709 Oak Avenue Sanford, Florida

LOWER COST
PACKER-HEAD WINGS
Proved to last as long or longer — yet cost considerably less. Write for prices.
TEXAS FOUNDRIES
LUFKIN, TEXAS

IDLE EQUIPMENT WASTES MONEY

A good way to get back a large part of the money you spent for equipment you're no longer using is to SELL IT.

And, the best way to sell it is through the Concrete Manufacturer, the Market Place for supplies and services.

Let someone else have the benefit of equipment you can't use in exchange for hard cash you can use in other ways.

So important is the Concrete Manufacturer used equipment section that many readers (and there are over 24,000 of them—all potential buyers) turn to it first when C M arrives on their desk.

Tell us what you have to offer for sale or trade, we'll set up the ad for you. Mail today and watch the results.

THE CONCRETE MANUFACTURER
431 South Dearborn St., Chicago 5, Ill.

Concrete Manufacturer Classified Section

431 S. DEARBORN ST., CHICAGO 5, ILL.

Advertising Rate Per Issue: $10.00 a Column Inch. Lower Rates on a Contract Basis — Write for Rate Card.

FOR SALE
BESSER "SUPER" VIBRAPAC

Available for immediate delivery. A-1 condition, Steam cleaned and Painted. 8" atachment and height control.

BOX NO. H-70, c/o THE CONCRETE MANUFACTURER
431 South Dearborn St.
Chicago 5, Illinois

CEMENT COLORS

All shades and grades the highest quality.
Write for color cards, prices and samples

RICKETSON MINERAL COLOR WORKS
MILWAUKEE 2, WISCONSIN
Established 1885

FOR SALE

1 #7 Stearns Joltcrete
1 Stearns Clipper with Chimney block Attachment
1 Stearns 28 ft. Mixer
1 Stearns 28 ft. Skiploader
2000 8" Steel Pallets
2000 12" Steel Pallets
3000 4" Steel Pallets
Lentel Forms
Splash Block Machine
Steel Racks & Jack Trucks

This machinery may also be purchased complete with buildings and sheds at a package price.

SOMERDALE BLOCK CO.
Harley Avenue Somerdale, N.J.

For Sale

Two C.T.M. transit mixers, one in operating condition. One needs some repairs. Both drums in excellent condition. Have several power take-offs available with mixers. Priced to sell for $850.00 for both or will trade for good used troughing belt conveyor 30' in length.

CONCRETE INC.
P.O. Box 432 Rogers, Ark.

FOR SALE

Concrete Products & Ready-Mixed Concrete Plant. Located in one of the fast growing industrial areas of central South Carolina. It is equipped with late model Besser block machine, 6 mixer trucks, and all other handling & Delivery equipment. It is now in operation, and has been operated for 2½ years. A modern designed plant. Present sales approximately $450,000 per year, should certainly grow. Ideal size for Owner-Management. Reason for selling: Owner is Manager, also has other management duties in larger plants. Wishes to slow down due to age, etc. Will sell reasonable, terms if desired. Complete information furnished upon inquiry.

BOX NO. D-54, c/o
THE CONCRETE MANUFACTURER
431 South Dearborn Street Chicago 5, Ill.

YOURS TO SERVE

If you have not found the equipment you are looking for, the research dept. of The Concrete Manufacturer can and will gladly assist you. Tell us what it is . . . Write to

Research Dept.
C/O The Concrete Manufacturer
431 S. Dearborn St. Chicago 5, Illinois

OPERATIONS MANAGER

Long established and progressive pre-mixed concrete company in major Canadian City requires the services of a man who is capable of taking complete charge of operating its 5 modern concrete plants and 100 plus truck mixer fleet. Applicants must have had previous experience and successful record in a similar capacity. Give age, particulars of experience, references, state when available and salary requirements. All replies will be treated strictly confidential.

BOX NO. K-90, c/o THE CONCRETE MANUFACTURER
431 South Dearborn Street
Chicago 5, Illinois

FOR SALE

Approximately one hundred twenty five (125) channel slab forms, 2'0 x 8'4", 3½" rib, 1" top. Forms made of 10. ga. sheet.

This is one of the best set of forms in the country. Have specials for overhanging ends and sides etc. Will ship one form for inspection at our expense. Priced far below replacement cost.

P. F. BLAIR AND SON
2902 West 41st Tulsa 7, Oklahoma

PLAIN STEEL PALLETS

Furnished from prime domestic open hearth mild steel plate.

Guaranteed Quality
Flat • Square • Accurate
any size or thickness

GARY STEEL SUPPLY COMPANY
2300 S. Springfield Ave. Chicago 23, Ill.
CRawford 7-2525

FOR SALE
Joltcrete & Equipment

1—No. 9 Joltcrete 45% void pallets, racks, turntables, air offbearer and mold boxes for the manufacture of 4", 8", 12" concrete and cinder block. This equipment is in excellent condition. Also spare motors and parts for the above equipment. Daily average production per 8 hour shift in 8" equivalents was:
Concrete units 4320
Cinder units 5760

Box No. E-61, c/o THE CONCRETE MANUFACTURER
431 S. Dearborn St. Chicago 5, Ill.

WANTED

Used Block Machines, Mixers, Elevators, Pallets, or any other type of Concrete Equipment in any kind of condition. Interested in renting site or space for Block Plant.

BOX NO. C-37, c/o THE CONCRETE MANUFACTURER
431 S. Dearborn St. Chicago 5, Illinois

USED EQUIPMENT FOR SALE

2—28' Stearns Mixers complete with motors, built-in V-belt drive and clutch, NiHard sectional liners and blades.
1—28' Stearns Skip Hoist complete with all motors and controls.
1—Truck-Man platform lift truck (power driven).
1—#9 Stearns Joltcrete Block Machine complete with all motors and controls and attachments for making 4", 8" and 12" block.
1—Chimney Block Attachment complete with 1,000 16x16" steel pallets (square hole).
20,000—4" Commercial steel pallets, code word Zorilla.
4,000—8" Commercial steel pallets, code word Dacoit.
2,400—12" Commercial steel pallets, code word Hansom.
4,000—8" Commercial steel pallets (modular size), code word Caste.
2,400—12" Commercial steel pallets (modular size), code word Calk.
1—Syntro-Pac two-at-a-time Plain Pallet Block Machine equipped with all necessary motors and controls, including air type offbearer and attachments for making 4"-6"-8"-12" block, chimney, block, brick and a number of specials.
1—28' Stearns Mixer complete with motor.
60—60-block capacity steel racks.
1,000—¼ x 18 x 18" plain steel pallets.

METROPOLITAN EQUIPMENT COMPANY
P. O. Box 4465 Washington 17, D. C.
Telephone Lawrence 6-1535

FOR SALE

Quinn Heavy type—4-foot — T&G — Pipe Moulds, excellent condition, Pallets & headers.
Roofing tile machine
Drain tile machine.

H. W. WILKISON
Dwight, Kansas

CEMENT COLORS

Write for free samples and prices of "LANSCO" CEMENT COLORS produced in 34 attractive shades. Packed in bulk and in 1 lb. and 5 lb. packages.

manufactured by
LANDERS-SEGAL COLOR CO.
71 Delevan St. Brooklyn 31, N. Y.

MIAMI, FLORIDA

Modern block plant operating as a going business. Established 1946. Sales last year exceeded 850,000 blocks. Total price $45,000 cash, plus inventory.

P. O. Box 1195 Coral Gables, Fla.

For sale or trade

Two C1M transit mixers and one good Homestead Hy-pressure steam generator for troughing belt conveyor, or electric welder, or on portable washing and screening plant.

CONCRETE INC.
P.O. Box 432 Rogers, Ark.

Speed Up Hand Work
with the
BIG BULLY
Air Hammer

- Clean Equipment
- Scrape Dry Concrete
- Clean Forms

Weight only 50 oz. 6 in. length, fits hand easily. Exclusive metering trigger delivers 0 to 9000 blows per minute. 28 tools available for 100 different jobs. Special tools made at your request.

Write for Complete Information Today

Clean Mixing Trucks Faster

Clean Fragile Mixing Equipment Safely

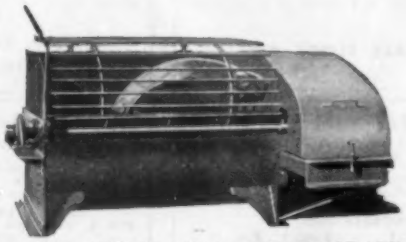
Vibrating Concrete From Hopper

Superior Pneumatic & Manufacturing, Inc.
4758 WARNER ROAD
CLEVELAND 25, OHIO

CLEAN UP! PAINT UP! WITH **AGRASEAL**

TAMMS INDUSTRIES, INC., 228 N. LaSalle St., Chicago 1, Ill.

PRASCHAK MIXERS



"THE MIXER THAT CAN TAKE IT"

8 Cu. Ft.	$520.00
16 Cu. Ft.	$693.00
21 Cu. Ft.	$777.00
30 Cu. Ft.	$1100.00
50 Cu. Ft.	$2300.00

FEATURE: "Wearhard" Cast Sectional Liners and Ni-Hard Blades, Heavy Steel Main Shafts, Rugged Ball Bearing Units, Locking Discharge Control, Extra Heavy Gears, All Welded Heavy Steel Construction.

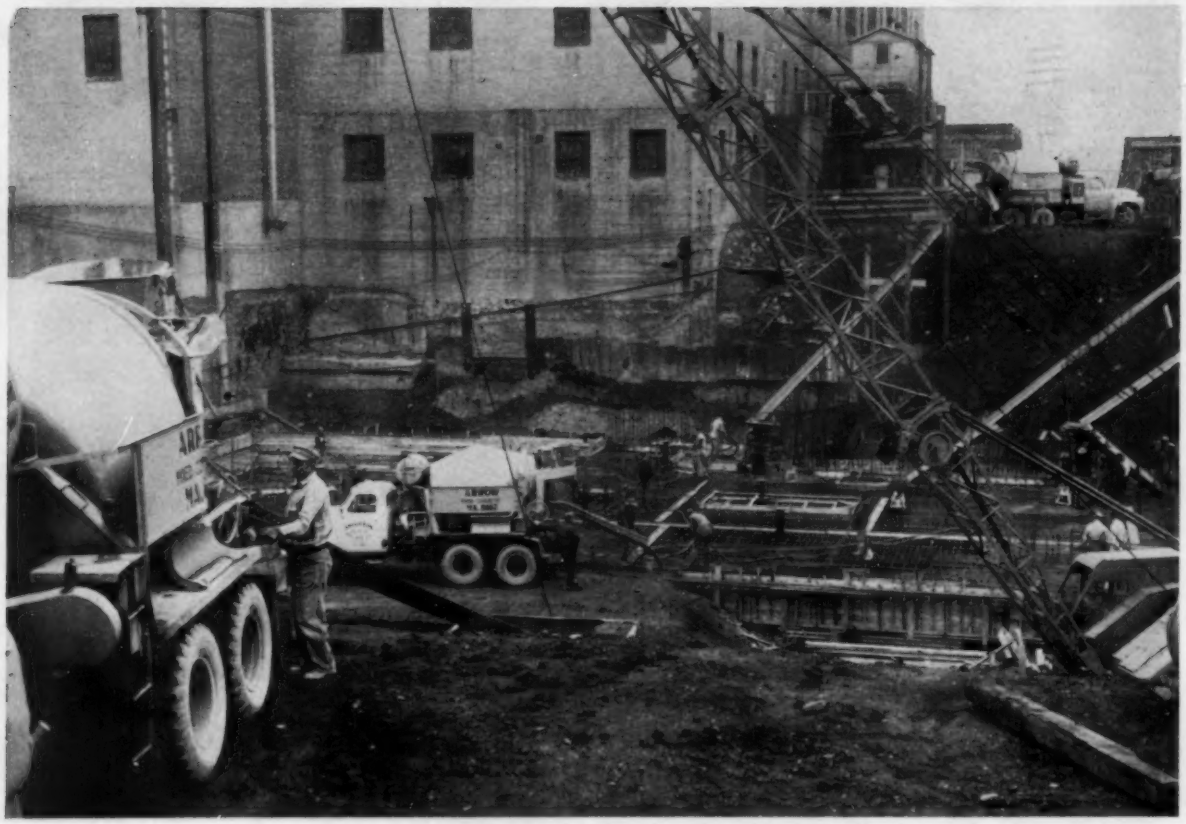
We Also Manufacture

Block Machines, Conveyors, Hammer-mill Crushers, Bucket Elevators, Lift Trucks, Rotary Screens, Silo Stave Machines, Electric Off-Bearers

PROMPT DELIVERY

Write today for complete information

PRASCHAK MACHINE CO.
MARSHFIELD WISCONSIN



Three simultaneous placing methods . . . by crane and bucket, direct pouring and 60′ chutes.

635 yds. in 6½ hours with 15 mile haul

Medium size plant does big job with Jaegers

Here's what a good operator can do with dependable truck mixers, even after some of them are 10 to 12 years old.

The contract, 10,000 cu. yds. of concrete for the Columbus & Southern Ohio Electric Co.'s Picway Powerhouse addition, included 8 monolithic foundation mats 4′6″ thick, for heavy generating equipment. The largest of these reinforced concrete mats, measuring 56′10¼″ x 66′9″, called for a continuous one-day pour of 635 cu. yds.

To meet this schedule, Arrow Sand & Gravel Co., with its ready-mix hauler, the Anderson Haulage Co., needed every mixer in its Jaeger fleet, plus 4 additional Jaegers supplied by the Columbus Ready-Mix Corp. Ten of these mixers were little 3 yd. units and 18 were 4½ yd. size.

They batched these 28 mixers at 3 different plants located 13, 15 and 16 miles from the job. On the site they had 6 places at which to unload. The concrete averaged 4½″ slump. It was placed by several methods simultaneously and then vibrated in the forms.

The first truck started at 7:40 a.m. At 2:10 p.m. the last of the 635 yds. had been poured — an average of 98 yds. an hour without a hitch.

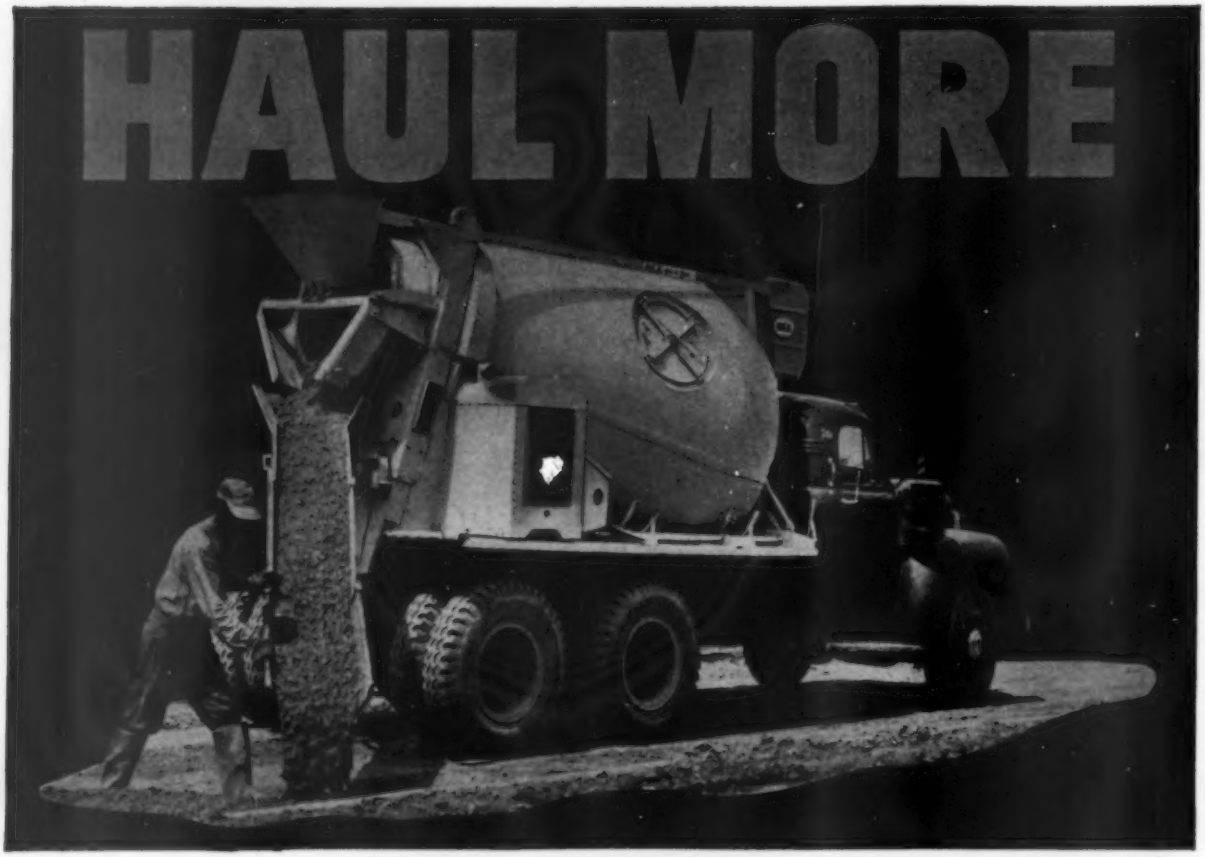
The Jaeger mixers used on this job ranged from 1 to 12 years old. There are good construction reasons for this long, dependable service. Ask your Jaeger distributor, or write for catalog.

60′ chutes were needed to reach forms. ⟶

THE JAEGER MACHINE COMPANY

602 Dublin Avenue, Columbus 16, Ohio

COMPRESSORS • PUMPS • LOADERS • CONCRETE MIXERS • PAVING MACHINES



...with Rex Adjusta-Wate Moto-Mixers

EVERY TRIP...because the exclusive Rex Adjusta-Wate design places load centers of gravity farther forward so that *all* axles of the truck can be loaded for *maximum legal payload.*

EVERY DAY...because the Rex Adjusta-Wate combines "time-saving" operating advantages, cutting minutes from each mixer operation. These minutes *saved* make possible shorter trip cycles...resulting in *more trips per day.*

EVERY SEASON...because the Rex Adjusta-Wate is built for years of dependable, heavy-duty operation, free from costly maintenance. Today, profitable ready-mixed plant operation demands a mixer to roll day after day, all season long without interruption.

The Rex Adjusta-Wate has the rugged construction and balanced design that mean lower maintenance cost, less down time, bigger legal payload...*every season.*

Add to profits...not to costs with a
Chain Belt Company, 4782 W. Greenfield Ave. Milwaukee, Wisconsin

REX ADJUSTA-WATE

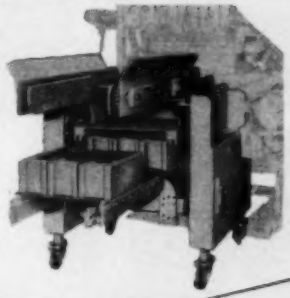
CHAIN BELT REX COMPANY

CONSTRUCTION MACHINERY

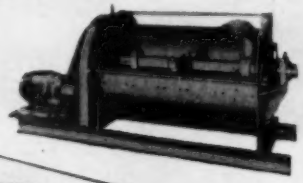
MOTO-MIXERS® MIXERS PUMPS PUMPCRETES® PAVERS

BERGEN

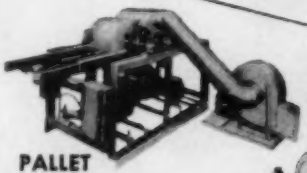
The "know-how" to produce. . . .



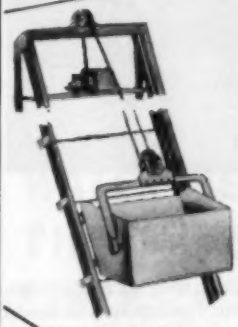
FRONT PALLET RETURN



BATCH MIXER

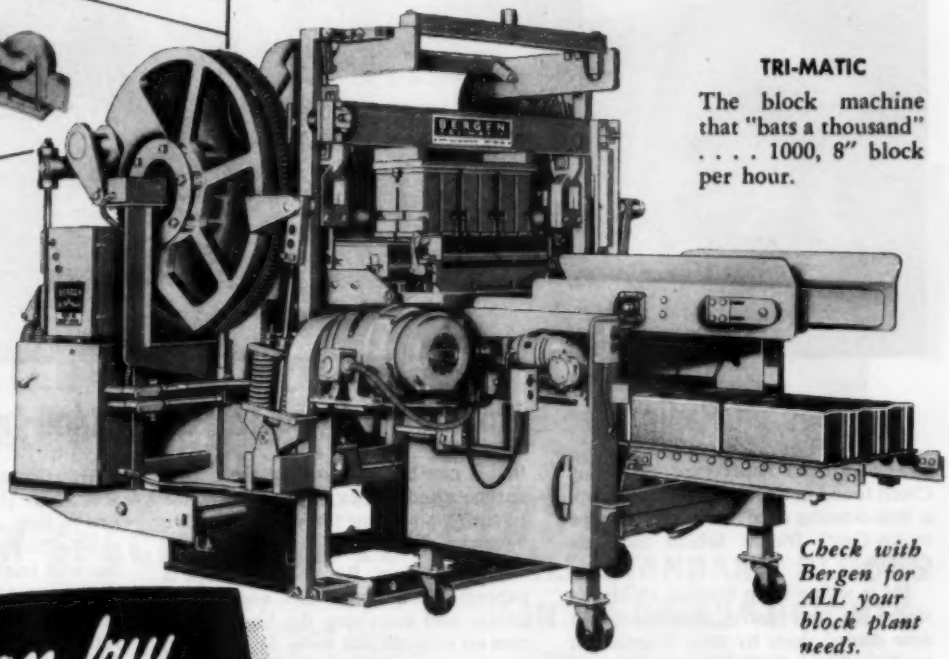


PALLET CLEANER



SKIP HOIST

Perhaps you wonder where Bergen Machine & Tool Company got the "know-how" to produce so many improvements on current machine and mixer parts, as well as completely new items of equipment. The answer lies in their THIRTY-THREE years of experience in making block, in plants under interlocking management. The four block plants associated with them have a combined output of OVER 20,000,000 block (8″ equivalent) annually, and provide them with the most perfect "testing laboratory" for new ideas. The folks at Bergen are truly block experts who recognize possibilities for more efficient parts and know how to design them for longer life.



TRI-MATIC

The block machine that "bats a thousand" . . . . 1000, 8″ block per hour.

Check with Bergen for ALL your block plant needs.

You can buy from Bergen with confidence

BERGEN MACHINE & TOOL CO., INC.
NUTLEY, NEW JERSEY

•

REPRESENTED IN CANADA BY
CONSTRUCTION EQUIPMENT CO., LTD.
404 OLD WESTON ROAD, TORONTO
Offices in HALIFAX, MONTREAL, LONDON and EDMONTON

Even a Boy can fight Communism with Truth

Kids on Radio Free Europe Send Hope To Pals Behind Iron Curtain

Twelve-year-old Karel Paces, a young Czech found in a German refugee camp, is broadcasting over Radio Free Europe to his Czech friends behind the Iron Curtain.

He is telling them familiar children's stories in their native tongue—stories now denied them by their Communist masters. These stories have a very real meaning to Karel's friends, a meaning ingrained in the folklore of their country.

Karel Paces is giving his friends, the boys and girls of his beloved Czechoslovakia, the truth of their own country and the free world. It is this truth which every American must support now so that it can be used to fight the deceit, darkness and despair which Communist tyranny is spreading through the satellite countries of Europe.

Day and night, Radio Free Europe is exposing Communist lies and propaganda, and sustaining the hope of oppressed millions that some day they will live in a better world.

At least $4,000,000 is needed this year to support and expand the operations of Radio Free Europe and Radio Free Asia. In addition, the Crusade for Freedom is seeking the signatures of Americans, on Freedom-Grams. These will be your personal pledges of hope for a free world.

This Crusade cannot succeed without your help. Your contribution is needed *now* to help support Radio Free Europe and Radio Free Asia . . . to help fight red lies with truth and to win the cold war.

Support this truth campaign now and help bring to millions the promise of future freedom.

Send your contribution to Crusade for Freedom, c/o your local Postmaster

Help Truth Fight Communism
Give To Crusade For Freedom

Contributed in the public interest by

Pit and Quarry Publications, Inc.

ONE-MACHINE BLOCK-PLANT

ONE Columbia 12" HIGH MAKES

WATER METER BOXES • DRAIN TILE • SILO STAVES • FLUE LINERS • PARTITION BLOCKS AND OTHER SPECIAL SHAPES

The Columbia 12"-High—on standard plain pallets and in its regular fast cycle—makes all the special shapes listed above... and many others! Some of these shapes have never before been produced on a standard block machine. NOW, with Columbia, block makers can enter these highly profitable fields... with a rugged, tested machine that gives automatic high production. Available in two-block and three-block sizes.

PLUS

ALL STANDARD BLOCKS IN 4"-8"-12" HEIGHTS

With a quick mold change, Columbia 12"-High can produce any of the more than 250 standard blocks made by its sisters, the Model 8 and Model 12. That's why we call the 12"-High ..."the One-Machine Block Plant"!

District Offices in: Wisconsin, Ohio, South Carolina, Mississippi, Florida, New Jersey, Virginia, California and Massachusetts.

Columbia MACHINE

Home Office: 107 S. GRAND, VANCOUVER, WASHINGTON
Factory Branch and Warehouse at Mukwanago, Wisconsin

WRITE TODAY!

for folder giving complete information on Columbia 12"-High

MORE "Take Home" DOLLARS for READY-MIX OPERATORS

Successful bidders in the ready-mix business have to meet varying conditions throughout the country. The T. L. Smith Company recognized this and was the first firm to engineer two distinct lines of truck mixers built to a high standard of quality, designed to meet highway weight laws, and priced to fit varying budgets. These mixers give you more "take home dollars", because there is a Smith-Mobile tailor-made to meet your individual problems. Write for bulletin.

PREMIUM Model
— the First Low-Cost High Quality Truck Mixer

PREMIUM Model Smith-Mobile, pouring very low slump concrete for bridge pier on new expressway.

LOWER IN WEIGHT . . . reduced nearly half a ton. LOWER IN HEIGHT . . . overall height reduced to get under bins with low headroom and low bridges. LOWER IN PRICE . . . you save hundreds of dollars and still get top quality. Contact your Smith dealer now. See how *much* you get in this profit producing mixer for so little money. Ask for bulletin.

Completely redesigned for greater efficiency than ever before. Better weight distribution permits bigger legal payloads. Gross weight reduced nearly 800 pounds. Shorter overall length. Engine accessibility unequalled. Two-speed transmission built to aircraft precision. Much increase in quality . . . no increase in price. See your Smith dealer.

DE LUXE Model, pouring basement. Note rate and uniformity of discharge.

DELUXE Model
— the Finest Truck Mixer that Money Can Buy

Biggest news of 1954 in truck mixers is the Smith-Mobile line, including the new PREMIUM models and the DE LUXE models . . . dependable aids to the landing of more successful bids and more profit. Contact your nearby Smith dealer, or write:

The T. L. SMITH COMPANY
2887 NORTH 32ND STREET • MILWAUKEE 10, WISCONSIN, U.S.A.
Affiliated with Essick Manufacturing Co., Los Angeles, California

SMITH
THE T. L. SMITH CO. MILWAUKEE U.S.A.

CONCRETE MIXERS

For BIGGER and BETTER Concrete Mixers and Truck Mixers . . LOOK TO SMITH

A 7989-1P

IF YOUR PLANS INCLUDE TOMORROW...

... Your Smartest Move Is HELTZEL Today!

Designed to meet future requirements —engineered for speed, accuracy and low cost operation — built to give you years of "around the clock" service . . . three good reasons why it's smart business to think of HELTZEL when you're thinking of concrete batching equipment.

For when you purchase HELTZEL you're making a sound investment in the future. You are assured of the very finest quality, the last word in modern batching methods, backed by almost 50 years of batch plant manufacturing know how.

Compare HELTZEL in every way — see the new Heltzel Type 2 and Type 3 plants — talk with owners and you too, if you're thinking about tomorrow, will invest in HELTZEL today!

HELTZEL
BATCHING PLANTS

The HELTZEL STEEL FORM & IRON CO., WARREN, OHIO
7500 THOMAS ROAD

THE HYDRO-LIFT UNLOADER

Weighs less than fifteen hundred pounds.

Delivers a perfect block—No corners broken.

If your truck gets you to the job Hydro-Lift will unload it.

Give us your truck at 7 A.M. and we will return it fully equipped by 7 P.M.

PATENT PENDING.

Positive hydraulic-power driven by engine Power Take Off. Perfect control of load at all times. Unload one lift per minute.

PRICE WITHIN BUDGET OF EVERY MANUFACTURER

The HYDRO-LIFT

- ✓ Will reduce delivery cost and pay for cost of installation in six months time.
- ✓ Will reduce your truck investment fifty per cent.
- ✓ Will deliver as many blocks as two or three men unloading by hand. DEPENDING ON LENGTH OF HAUL.

Write G & H MACHINE COMPANY

P.O. Box 38 Columbia, Pa.

"Color" FOR CONCRETE PRODUCTS

PERMANENT • STRONG • BRILLIANT

PURE SYNTHENTIC IRON OXIDE REDS

YELLOWS

BROWNS

BLACK

C.P. ULTRAMARINE BLUE

PERMANENT GREEN

Write for Information

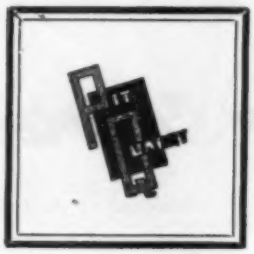
Distribution Points Throughout The Country

FRANK D. DAVIS COMPANY

2704 Santa Fe Avenue
LOS ANGELES 58, CALIFORNIA

OVER 17,000 POTENTIAL BUYERS

AT YOUR FINGERTIPS



LIST YOUR USED EQUIPMENT OFFERINGS REGULARLY in the * BROADCAST SECTION of

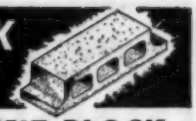
PIT AND QUARRY

431 So. Dearborn St. Chicago 5, Ill.

The meeting place for buyers and sellers

*Largest Classified Advertising Section Serving the Industry

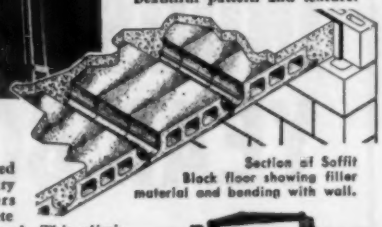
SELL MORE BLOCK ON EVERY JOB!



Furnish VIBRAPAC SOFFIT BLOCK for ALL FLOORS and ROOFS

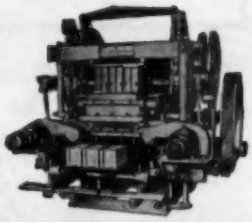
Removing Centers from Finished Floor.

Permanent, Fireproof Floors and Roofs. Low initial cost and maintenance. Natural base for radiant heat installations. Provide surface of maximum acoustical and insulation value. Can be plastered, or if left exposed, makes a ceiling of beautiful pattern and texture.



Section of Soffit Block floor showing filler material and bonding with wall.

Soffit Block are supported in place with temporary adjustable steel centers while reinforced concrete slab is placed and cured. This eliminates timber shoring and leaves space below clear during construction.

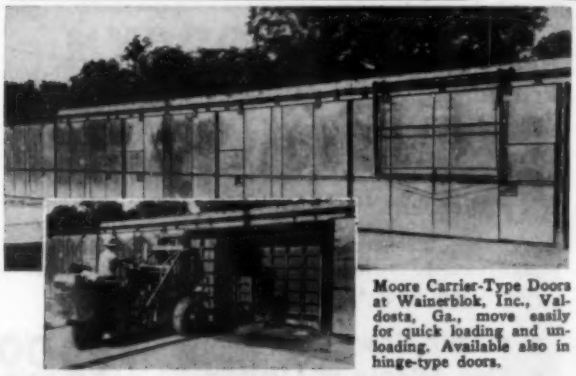


BESSER VIBRAPAC PRODUCES SOFFIT FLOOR AND ROOF UNITS

The same machine that produces high quality concrete masonry units in all styles and sizes, using Plain Pallets. Continuous, full capacity operation. Fully automatic. No machine operator required.

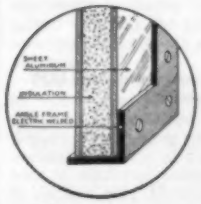
BESSER MANUFACTURING CO.
ALPENA, MICHIGAN, U. S. A.
Complete Equipment for Concrete Products Plants

A 5867-¼R2



Moore Carrier-Type Doors at Wainerblok, Inc., Valdosta, Ga., move easily for quick loading and unloading. Available also in hinge-type doors.

Moore Metal-Insulated Kiln Doors Save Fuel—Reduce Curing Time



Keep heat where it belongs—inside the kiln—with Moore Aluminum-Insulated Doors. They improve curing conditions—save steam—last longer.

Send us dimensions of present door openings for quotation.

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Oldest and Largest Manufacturers of Dry Kilns and Veneer Dryers
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CUT GLOVE COSTS 40% to 70% in concrete products plants

for coarse cinder block, bagged cement, other sharp or slippery materials

Grab-it gloves, palm-coated with tough, rough-textured natural rubber, have positive non-slip grip and best resistance to sharp-cutting materials. Outwear ordinary canvas gloves up to 10 times. Choice of knit-wrist, elastic wrist, band top or safety cuff styles.

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Monkey-Grip gloves, coated with permanently flexible plastic, are specially resistant to abrasion and grease. New wing thumb and curved, *pre-flexed* fingers fit the hand all over. Far outwear ordinary plastic gloves. Six fully coated or palm coated styles.

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Free Test Offer: Employers, send brief description, on business letterhead, of your operation and materials handled. Without charge, we will forward samples of the gloves we recommend, for on-the-job test. Address

Edmont Manufacturing Company
1208 Walnut St., Coshocton, Ohio
World's largest maker of coated industrial gloves

the ALLIED metals company
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Durable, longer-lasting plain steel pallets!

Mail this coupon for immediate price quotation!

THE ALLIED METALS COMPANY
Niles, Ohio

Please send me a quotation on the quantities I have indicated below! No obligation, of course!

_____5/16" — 18-1/2" x 26"	_____5/16" — 18" x 20"
_____ 1/4" — 18-1/2" x 26"	_____ 1/4" — 18" x 20"
_____5/16" — 18" x 18"	_____5/16" — 18" x 19"
_____ 1/4" — 18" x 18"	_____ 1/4" — 18" x 19"
_____5/16" — 18" x 22"	_____5/16" — 18-1/2" x 18-1/2"
_____ 1/4" — 18" x 22"	

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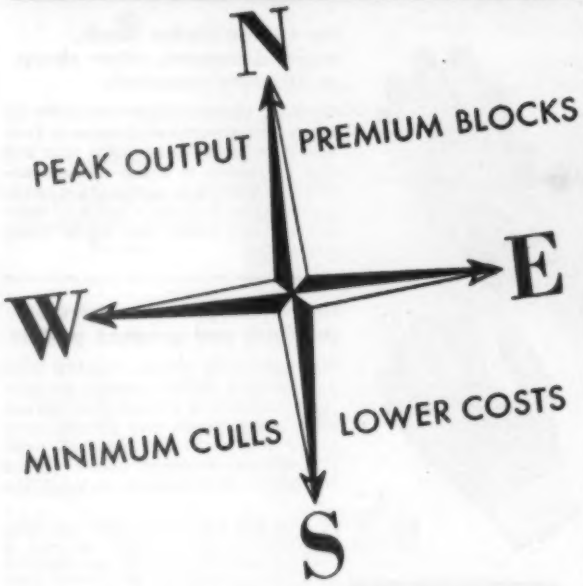
COMPANY _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

flat, steel **Pallets** de-burred!

OSWALT SERVICE
boosts VIBRAPAC Efficiency



BLOCK MAKERS THROUGHOUT THE U. S. A. are interested in the high production-and-profit records set by OSWALT-Serviced Vibrapac machines.

Three OSWALT features identify this plant-tested method of insuring top operating efficiency:

1 Improved Vibration and machine changes to increase output 50% or more without sacrifice of quality.

2 New Simplified Height and Density Control to assure uniform quality blocks.

3 Shock-Free Ejector and Front-End Pallet Feeder to prevent green cracking and reduce culls to a minimum.

Proved by years of experience, OSWALT Service has benefited scores of producers from coast to coast.

Two U.S. Patents have been allowed on Oswalt Improvements, one on the Synchronized Vibration, and the other on the Lug Link used in speedup.

Write for name of OSWALT-Serviced plant nearest you.

New Oswalt Booklet has full details

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Experienced Operators Turn to the Yearbook as the Final Authority

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Established producers and newcomers alike will find in this bigger and better Yearbook a wealth of well-arranged, specific operating information to assist them in solving production problems and increasing profits. Plant design, the selection and characteristics of raw materials, batching, mixing, curing, handling and marketing are just a few of the important subjects treated.

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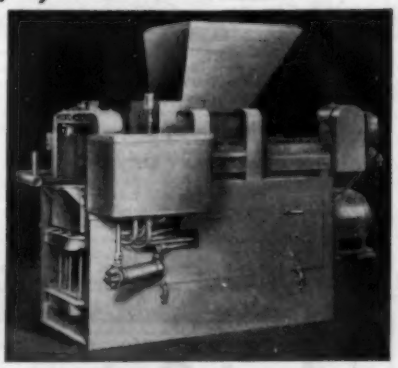
HYDRO-KORPAK

The Superfine Block Machine



At last comes a block machine of streamlined compactness, where high production is obtained by low labor costs, and where initial investment is in line with modest budgets. In design, operating efficiency, capacity range and price, the Hydro-Korpak is aimed to bring the production economies of advanced engineering within reach of average sized plants with normal sales potentials.

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FOR HANDLING CONCRETE AND CERAMIC PRODUCTS *YOU NEED*

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NO SEAM HERE
The wing thumb construction multiplies glove life.

TOUGHEST WHERE WEAR IS ROUGHEST

Putting the wear in gloves at the right point really helps reduce glove costs and with Tripl-Palm you get an added cushion for hand comfort. Tripl-Palms are available in knit wrist, and gauntlet styles and coated or "free-breathing" backs. At your Jobber or write for information.

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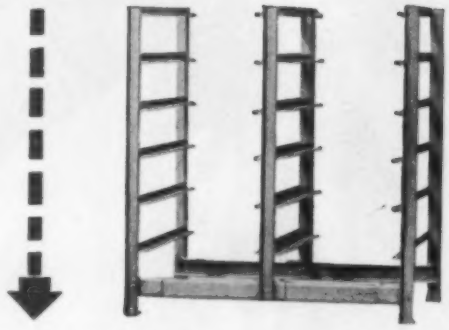
THE SURETY RUBBER CO.
CARROLLTON, OHIO

CHASE BLOCK RACKS, PLAIN STEEL PALLETS

Your best buy



Here's why . . . Standard style or specially designed, Chase racks meet your requirements. They're shipped painted and knocked down—assembly is easy—no special tools or welding needed. Chase experience means low prices and years of dependable service. Check Chase prices.

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2300 PARSONS AVENUE • COLUMBUS 7, OHIO

BETTER KILN CLOSURES

Above: Universal Doors and Carriers at Patterson Supply Co., Monongahela, Pa.

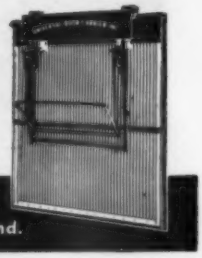
CAN *cut your costs per block—and improve your quality-uniformity*

Block plants the country over are reducing the cost of curing and stepping up quality-uniformity by installing modern, efficient, kiln closure equipment. They have found it *stops costly losses of heat and steam* and helps *achieve uniform curing conditions.* Why not investigate—

Universal

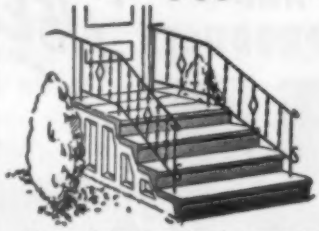
fully insulated, all-metal DOORS
and world-famous DOOR CARRIERS

50th Anniversary 1904-1954



UNIVERSAL DOOR CARRIER, INC.
1117 Cornell Ave., Indianapolis 2, Ind.

NOW MORE THAN **140** LICENSED MANUFACTURERS *Producing*



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homeward
Concrete STEPS

A Small Investment That Pays Big Dividends

Homeward all metal forms are precision built to produce a product that requires no hand finishing.

The exclusive franchise for your territory may still be open.

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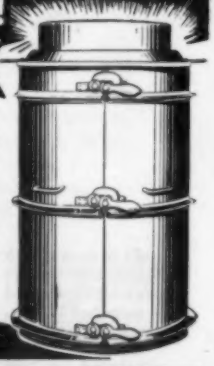
FOR THE FINEST CONCRETE PIPE... YOU NEED FINEST FORMS!

THE *Quinn Standard*



Backed by over 40 years of reliable service, the QUINN STANDARD is recognized as the finest concrete pipe form the world over. Thousands of pipe manufacturers, from the smallest to the largest, look to Quinn for equipment to produce the finest concrete pipe at the lowest possible costs.

• QUINN HEAVY DUTY PIPE FORMS

For making pipe by hand methods by either the wet or semi-dry process. Sizes for pipe from 10" to 120" and larger. Tongue and groove or bell end pipe in any length desired.

WRITE TODAY for complete information and estimates.

Also manufacturers of
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JOHNSON ELEVATOR CHAINS

- long-life carburized steel knuckles
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All-welded BUCKETS

- light, durable, smooth
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- agg.: 10x6, 12x8, 14x8, 16x8"

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Send information on: ☐ buckets ☐ elevator chains
NAME .....
STREET .....
CITY, STATE ..... J342REV. PO

Just Out . . .

Your guide to the booming concrete industry

16th Edition

CONCRETE INDUSTRIES YEARBOOK

Covering the concrete block and ready-mixed industries

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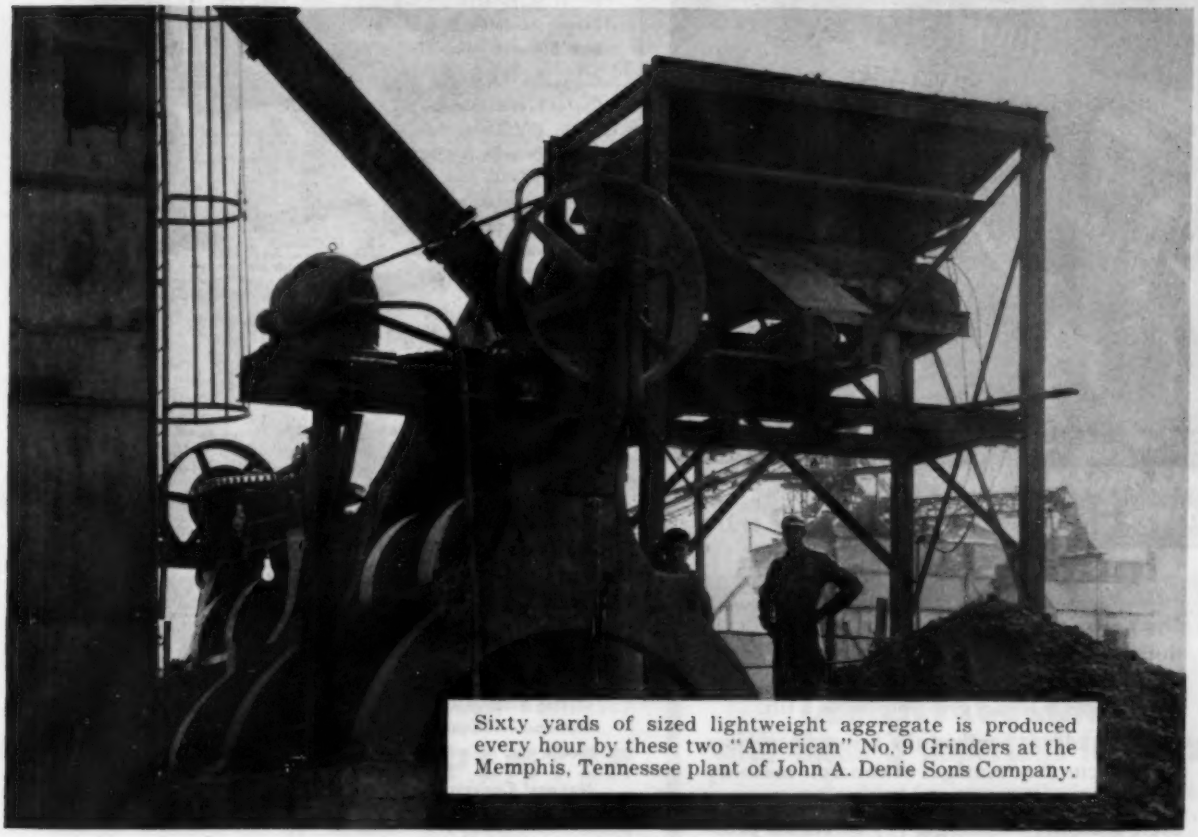
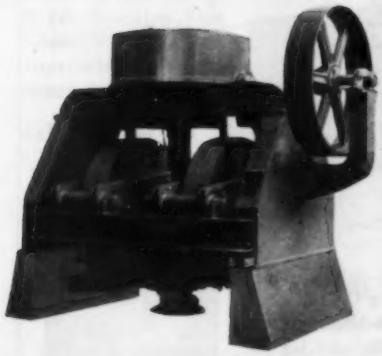
"AMERICAN" grinds aggregate

at half the cost



Sixty yards of sized lightweight aggregate is produced every hour by these two "American" No. 9 Grinders at the Memphis, Tennessee plant of John A. Denie Sons Company.



● Newest "American" Rim Discharge Grinder No. 9A . . . 30 yards rated hourly capacity. Yoke-mounted mullers save power, reduce starting load . . . long-wearing cut-steel gears run in oil . . . entire design insures trouble-free, economical operation. Other "American" grinders from 4 to 75 yards per hour . . . there's an "American" Grinder exactly suited to your type of aggregate and your capacity requirement.

The Problem—COST

Production of sized lightweight aggregate at the Denie plant was too costly . . . the hammer mill made heavy power demands, and shutdowns for maintenance and repair were frequent.

The Solution—"AMERICAN"

The equipment was replaced with the two "American" No. 9 Rim Discharge Grinders pictured, totalling 60 yards hourly capacity.

The Result—SAVINGS

50% reduction in power consumption • 50% less maintenance time and cost • virtual elimination of shutdown time.

American

SINCE 1857

FROM CLAY BANK TO KILN

THE W. A. RIDDELL CORPORATION

BUCYRUS, OHIO

Hitch a ride to Increased Sales

Don't miss the bus! Portland Cement Association advertising in the leading farm and home magazines that circulate right in your territory is a vehicle that can give your sales a lift.

These ads: (1) tell of the beauty, economy and structural advantages of concrete masonry construction, (2) create a real desire for concrete masonry buildings, (3) direct all prospects *to you* for more information.

When prospects call, help them with their plans and problems. Give them the names of architects, builders and lending agencies experienced in concrete masonry construction. Such help turns inquiries into sales for you.

To have as many prospects as possible calling *on you,* make it a practice to mention, by page and magazine name, the current PCA ad in your own newspaper, radio, television or direct-mail advertising. Explain that your plant is local headquarters for concrete masonry construction information.

You'll find that tying-in with PCA ads and following through with this type of service will truly put you "on the bus" that leads to more farm and home sales for your products.

PORTLAND CEMENT ASSOCIATION
33 West Grand Avenue, Chicago 10, Illinois
A national organization to improve and extend the uses of portland cement and concrete . . . through scientific research and engineering field work

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Make this your BEST year with the BES-STONE Block Splitter

Front view showing operator feeding block into BES-STONE Block Splitter.

Expand Your Opportunities — Cash in on the Split Block demand. Its "quarried stone" character pleases owners. You'll find it ideal for all structures, large or small . . . commercial, institutional or home construction. BES-STONE challenges the creative ability of both architects and builders.

Splitters in 18" and 24" sizes — Automatic, powerful, hydraulic operation . . . up to 960 Split Block per hour. Straight line cuts . . . No cull block. Easily adjustable for splitting various block heights. Block is placed under knife, automatically. And the finished Split Block is automatically removed from under the splitting knife by the incoming block. Quiet, safe operation.

Fast, Accurate

Profitable Producer of 960 Split Block per Hour!

There's big money for you in attractive, permanently colorful BES-STONE Split Block. It complements and increases sales of standard stripper block. Get all the facts. Write for BES-STONE Bulletins 95A and 100.

BESSER 50th Anniversary 1904-1954

Note the natural beauty of BES-STONE. No maintenance, no painting, no peeling off.

BES-STONE *the Split Block with Character*

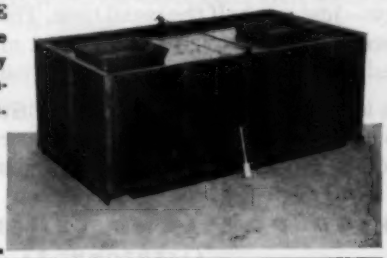
BESSER MFG. CO. • Complete Equipment for Concrete Products Plants • Alpena, Michigan, U.S.A.

A 7908-½-H

HOW can Concrete Producers Boost Business?

THE $64 ANSWER IS CARPENTER

That's right! CARPENTER Septic Tank Forms and Handling Equipment provide fast, low-cost output of a product in demand everywhere. ONE MAN handles the CARPENTER delivery rig. Satisfied customers all over the U.S.A.



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Box 470, Harvie Rd.
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CEMENT COLORS with these 3 important features:

- Reichard-Coulston synthetic and natural cement colors are limeproof.
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- Reichard-Coulston pigments conform to all cement and concrete specifications for color.

Choose from a wide range of Reichard-Coulston natural and synthetic cement colors: reds, yellows, browns, green. For FREE color card, write today.

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15 East 26th St., New York 10, N.Y.

OUR 100th YEAR: 1854-1954

FACTORY: Bethlehem, Pa.
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Attention_____

Street_____

City_____ Zone____ State_____

Here's Your Big Money Maker!

One machine to make drain tile in all the popular sizes. **TURN CONCRETE INTO GOLD SHECKLES** with the **MARVEL 8.**

- Modest Investment
- Low Operating Expense
- All year demand for **MARVEL TILE**

Bulletin and facts sheet upon request. Write today!

Concrete Machinery Company
Hickory 21, North Carolina

The World's Largest Manufacturer of Aluminum Molds for Concrete Yard and Garden Ornaments.

The new Senior High School Gymnasium at Greensboro, N. C. will have a playing floor 118 ft. square without obstructions. The reinforced concrete design with prestressed concrete girders saved the school district $10,000 over an alternate design calling for another structural material.

Owner:
GREENSBORO SCHOOL BOARD
Architect:
McMINN & NORFLEET,
Greensboro, N. C.
Consultant on Roof design:
THE FREYSSINET COMPANY,
New York City
General Contractor:
L. B. GALLIMORE CO.,
Greensboro, N. C.
Subcontractor for Prestressed Girders:
ARNOLD STONE COMPANY,
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Ready Mix Concrete:
F. D. LEWIS & SON,
Greensboro, N. C.

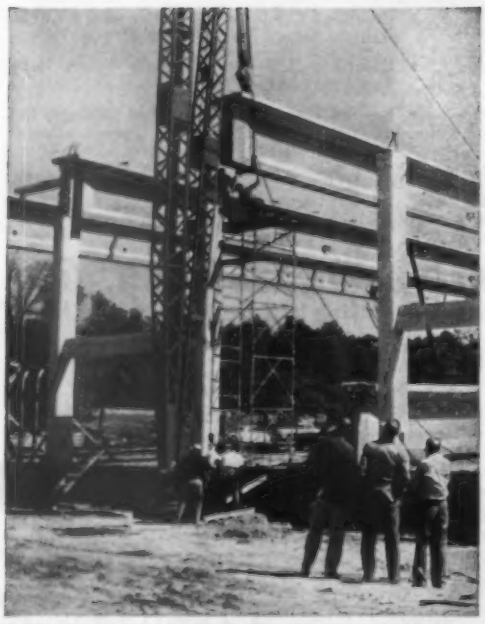
PRESTRESSED ROOF GIRDERS made with **LEHIGH EARLY STRENGTH CEMENT** SET NEW SPAN RECORD

The use of prestressed concrete continues to increase as architects and engineers design longer beams of less depth and weight. For example, the seven 120 ft. roof girders in Greensboro's new High School gymnasium are the longest prestressed concrete girders used to date in U. S. building construction.

Made with Lehigh Early Strength Cement, the girders reached the required prestressing strength of 4500 PSI in 6 days – just one half the usual time. This construction speed reduced labor and overhead costs . . . made it possible to go ahead with the rest of the job at an earlier date.

This is typical of how Lehigh Early Strength Cement can help manufacturers of prestressed concrete units save time, cut costs and meet high quality standards.

LEHIGH PORTLAND CEMENT COMPANY
ALLENTOWN, PA.



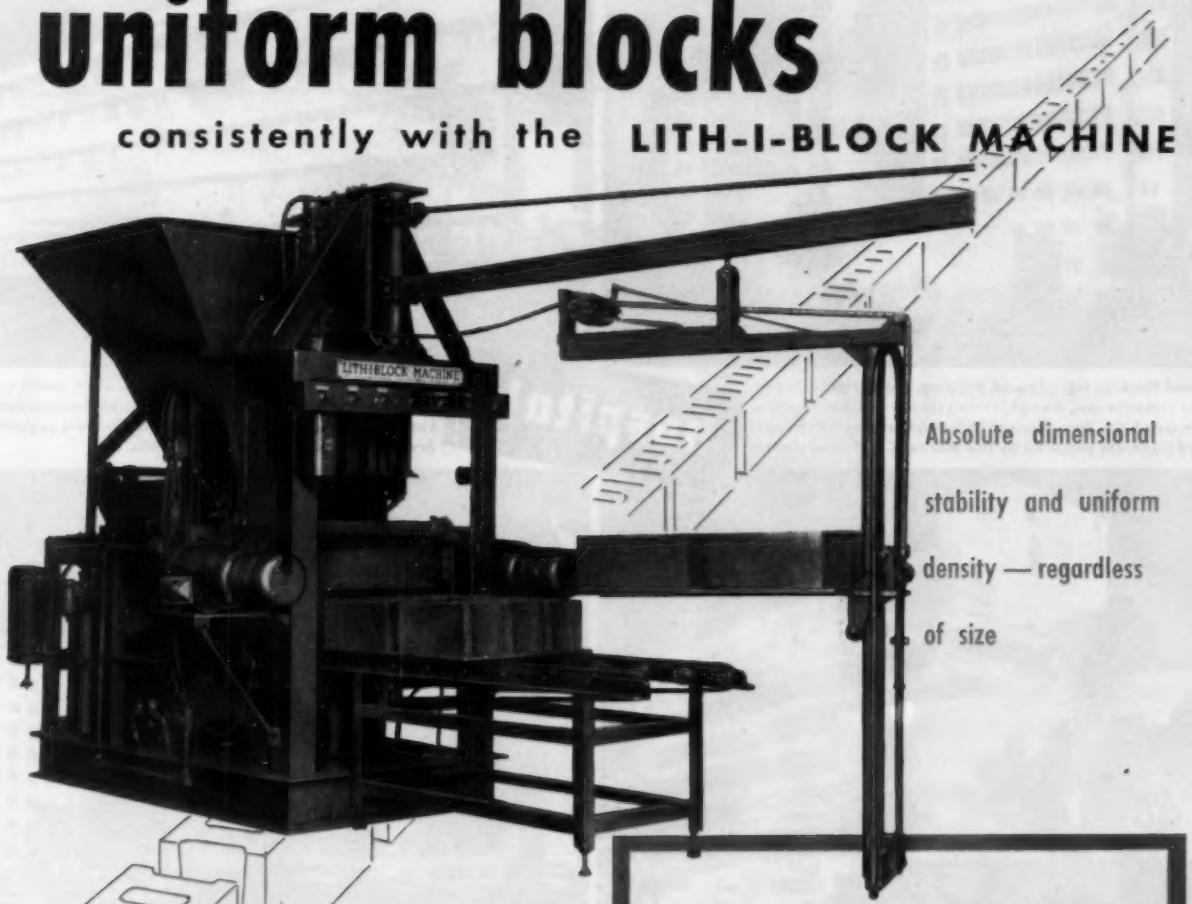
Guy derricks were used to erect the girders which were then tied to their columns with tensioned cables. Lifting them took about 1½ minutes; setting the girders on their bearing plates took ten minutes more.

A single set of ⅝" thick plywood side forms were used for all seven girders. Only three sets of base forms were needed, because they could be easily removed for re-use when prestressing forces deflected the girders upward.

LEHIGH PORTLAND CEMENT • LEHIGH EARLY STRENGTH CEMENT • LEHIGH AIR-ENTRAINING CEMENTS • LEHIGH MORTAR CEMENT

uniform blocks

consistently with the LITH-I-BLOCK MACHINE



Absolute dimensional stability and uniform density — regardless of size

With LITH-I-BLOCK MACHINE you get a perfect finished product with each cycle. From the start right on through to the end of the batch every block is exactly the same height, the density is constant — top, middle and bottom. Sharp edges all around instead of feathered edges that distort the mason's line. You can rest assured that every Lith-I-Block will be square at every point. It is no wonder that contractors the country over are turning more and more to the Lith-I-Block building units.

4-POINT HEIGHT CONTROL All four corners of the block forming unit rigidly set to insure top and bottom surfaces parallel.

QUICK-CHANGE MOLD BOX Complete change-over, including strippers, can be made in less than twenty minutes.

SPLIT CYCLE CONTROL Production cycles may be stopped at any point or switched from automatic to semi-automatic or manual at any phase of the process.

ELECTRIC FEED DRAWER TIMER Simply and accurately controls amount of aggregate deposited in mold box — easily adjustable.

STANDARD PLAIN STEEL PALLETS With Lith-I-Block you need only one set of pallets for all shapes and sizes of block.

TAMP AND/OR PRESS Tamp at any frequency or simply weight press — or do both in the same cycle — assuring uniform texture throughout the block.

ADJUSTABLE VIBRATOR UNITS Independent of mold box; allows adjustment of speed and direction to provide right vibration for every aggregate.

CONVENIENT OPERATION Two sets of controls — one at finger tips of operator on Offbearer and another set on panel at front of machine.

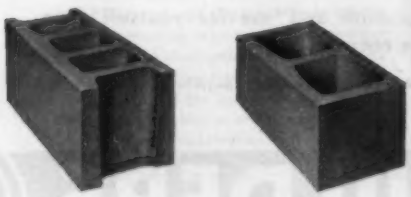
4 OR MORE CYCLES PER MINUTE with sand and gravel — still more when running light weight aggregate.

All features available with either Model L-5 3-Block machine or Model L-3 2-Block machine.

SAVES YOU MONEY TO BEGIN WITH — EARNS YOU MOST IN THE LONG RUN

LITH-I-BLOCK MACHINE

A Product of
THE LITH-I-BAR COMPANY
HOLLAND, MICHIGAN



WRITE TODAY FOR COMPLETE DETAILS ON LITH-I-BLOCK MACHINE

LITH-I-BAR CO. HOLLAND, MICH.

Please send full information on LITH-I-BLOCK MACHINE

Firm Name_____

Individual_____ Position_____

Address_____ Phone_____

City & State_____

General Hospital Neurological Building, Philadelphia, Penna. Archt.—Harbeson, Hough, Livingston & Larson; Contr.—McCloskey & Co., Inc.—both of Philadelphia. Pozzolith Ready-Mixed Concrete supplied by The Warner Co., Philadelphia.

St. Joseph's Hospital Addition, Burbank, Calif. Archt.—John W. Maloney, Seattle, Wash.; Contr.—Pozzo Construction Co., Los Angeles. Pozzolith Ready-Mixed Concrete supplied by Jewel City Ready-Mix Co., Beverly Hills.

hospitals

Permanente Foundation Hospital, Los Angeles, Calif. Archt.—Wolff and Phillips, Portland, Oregon; Contr.—C. L. Peck, Los Angeles. Pozzolith Ready-Mixed Concrete supplied by Graham Brothers Co., Los Angeles.

Veteran's Hospital, New Orleans, La. Archts.—Favrot, Reed, Mathes & Bergman, New Orleans; Faulkner, Kingsbury & Stenhouse, Washington, D.C.; Contr.—Robert E. McKee, Dallas, Tex. Pozzolith Concrete batched at job site.

concrete produced with POZZOLITH

better in these ways:

- **greater durability**
- **reduced shrinkage**
- **lower permeability**
- **minimized segregation**
- **increased bond to steel**

because...

Pozzolith enables builders to obtain better quality concrete—with maximum economy—because it:

1. **Reduces *unit water content*—most important basic factor affecting concrete quality*—by 15%.**
2. **Entrains the *optimum* amount of air.**
3. **Fully complies with the water-cement ratio law—basis of ACI and ASTM procedures of design, specification and production of concrete.**

Full information on Pozzolith and "see-for-yourself" demonstration kit sent upon request.

*** See Bureau of Reclamation's *current* Concrete Manual, Page 130.**

The MASTER BUILDERS Co

CLEVELAND 3, OHIO • TORONTO, ONT.

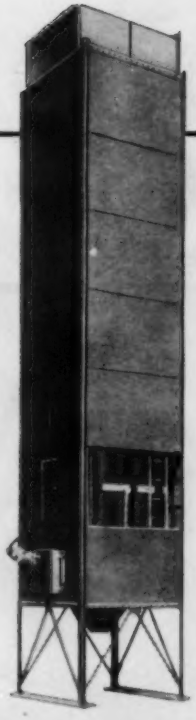
Subsidiary of American-Marietta Company

Cable Address, Mastmethod, New York

The latest advancement in dust recovery

Dualaire*

REVERSE-JET DUST COLLECTOR!



- *Cleans without jarring or rapping!*
- *Maintains uniformly low pressure drop!*
- *Field-proven efficiency as high as 99.99%!*

Backed by the same organization that pioneered commercial application of COTTRELL Precipitators and MULTICLONE Collectors, the DUALAIRE Reverse-Jet Dust Collector is revolutionizing filter-type recovery systems. The DUALAIRE gives you vital advantages like these . . .

REVERSE-JET CLEANING ACTION cleans the filter tube continuously in small increments—not with sudden surges as in rapping or jarring.

CLEANING ACTION starts automatically and stops automatically to keep pressure differential within low pre-set range.

FILTER EFFICIENCY remains uniformly high at all times because no thick filter cake ever forms to reduce effectiveness. Actual field tests show efficiencies as high as 99.99%!

NO STANDBY UNITS, with their complicated switching devices, are needed. The DUALAIRE is cleaned as it filters—without interruptions or shut down periods for cleaning. The operation is continuous!

FILTER UNITS LAST LONGER because they are not subjected to intermittent jarring, rapping or vibration—all destructive to filter fabrics.

The above are only a few of the many important advantages you get in DUALAIRE Dust Collectors. This 12 page booklet gives the full story . . . explains how reverse-jet cleaning action works — shows how the basic DUALAIRE unit is adaptable to a wide range of operating requirements — provides facts, figures and illustrations that will change your thinking on filter-type recovery systems. Send for your free copy of this descriptive booklet — or see your nearest Western Precipitation representative!

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DESIGNERS AND MANUFACTURERS OF EQUIPMENT FOR COLLECTION OF SUSPENDED MATERIALS FROM GASES & LIQUIDS

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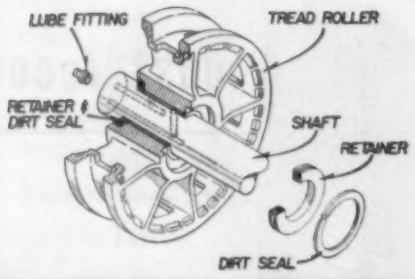
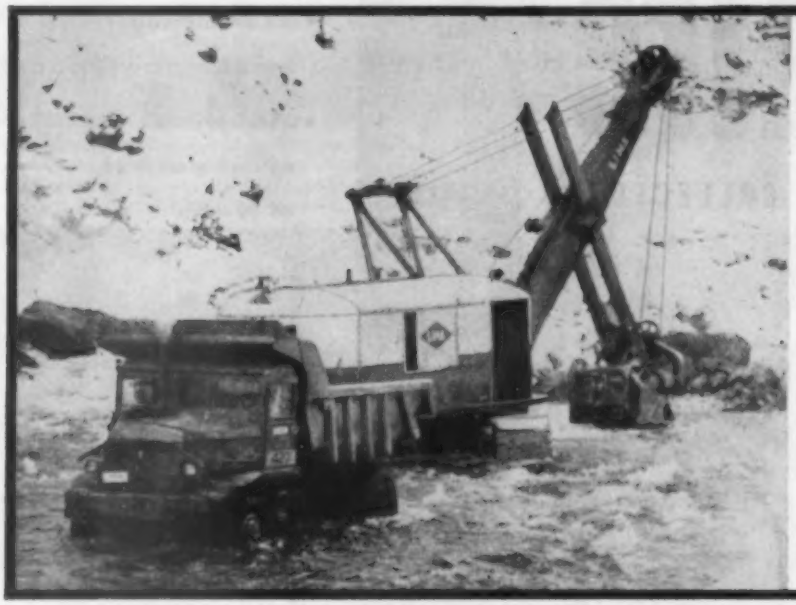
*"Dualaire" & "Multiclone" ® Licensed by H. J. Hersey, Jr.



LIMA DIRT SEALS CUT DOWN-TIME AND MAINTENANCE COSTS



This LIMA shovel, demonstrates the importance of LIMA'S dirt seals and grease retainers.

In such work, abrasive material which wears out the bushings and shafts of ordinary shovels is excluded. LIMA seals the lubricant in and dirt out, thereby reducing friction and prolonging the life of bushing, roller and shaft.

COMPARE! No other machine gives you as much as LIMA!

1. Bronze bushings in tread, idler and drive rollers are protected by piston-type dirt seal rings and retainers.
2. All gears, smaller parts and shafts which are subject to extra wear are flame or induction hardened for longer life.
3. Main machinery is placed well back of center of rotation to eliminate excess counterweight.
4. Anti-friction bearings, used at all important bearing points, reduce destructive friction, fuel consumption and lubrication requirements.
5. Big capacity drums and sheaves lengthen cable life by reducing the need for double wrapping and sharp bends in cable.
6. Full air controls on travel, hoist, swing and boom hoist, result in smoother, more precise operation, minimum maintenance and less operator fatigue.
7. Torque converter (optional) automatically adjusts speed to load requirements, minimizing shock loading, making performance smoother and faster.
8. Wherever you are, you can depend on skilled service and nearby warehouse stocks of parts to keep your LIMA on the job continuously.

COMPARE and you'll specify LIMA for shovels (¾ yd. to 6 yds.), cranes (to 110 tons) and draglines (variable).

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Construction Equipment Division

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LIMA, OHIO, U.S.A.

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Horsepowers, 30 to 255. Two-cycle. 2, 3, 4. 6-cylinder models. Speeds to 1800 rpm. Stationary, mobile, marine. Diesel-generator sets

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lowest price per horsepower . . .
lowest weight per horsepower

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Editorial Map shows territory covered by PIT AND QUARRY Editors in just ONE year of travel

ABC NBP BPA

WALTER E. TRAUFFER, *Editor*

Graduate civil engineer. Member of the editorial staff for 27 years. Before coming with Pit and Quarry he worked as an engineer on concrete dam, bridge and building construction. He has probably visited more nonmetallic minerals and concrete manufacturing operations in America than any other man. This has given him a valuable fund of experience and information about these industries and their problems. Member of American Institute of Mining and Metallurgical Engineers and Chicago Engineers Club.

KENNETH A. GUTSCHICK, *Field Editor*

Before joining the editorial staff in 1952, he taught geology at Notre Dame for two years and had previously worked as a supervisory trainee in the operating departments of a major Midwestern producer. He has also worked on heavy building construction, and holds degrees from the University of Chicago, where he majored in physical and economic geography. His master's thesis consisted of a thorough study of the building material industries in Metropolitan Chicago.

ROY L. PECK, *Field Editor*

Graduate civil engineer with 25 years experience in various phases of construction. Four years with Portland Cement Assn., and two years with Pittsburgh Testing Lab. in charge of concrete testing. Also with Marquette Cement Mfg. Co., and Haydite Division, Western Brick Co. Secretary Nat'l Concrete Masonry Assn. Served in Air Force World War II. Also with Cook Bros. Equipment Co., and Chain Belt. Traveled extensively visiting concrete plants, pits and quarries. Member Phi Kappa Sigma, Theta Tau and several engineering associations.

HARRY F. UTLEY, *Pacific Coast Editor*

A member of the editorial staff for 25 years, he has traveled widely and written many articles. For the past 10 years the Pacific Coast has been his field. After leaving college, he had wide experience in the field of cement and concrete and was for some years associated with the Portland Cement Association.

PIT AND QUARRY Editors build editorial quality to make your advertising more productive

OUT IN THE FIELD pretty much sums up the PIT AND QUARRY brand of editors. The teeth of their excellent editorial feature stories have been sharpened on the sand, gravel and rocks of the quarries . . . out in the field! That's where editorial quality originates . . . with PIT AND QUARRY editors who know the industry . . . know the men.

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CAN MEAN YOUR PROFIT!

Twenty seconds on every trip made—that's what an Athey PD20 Side-dump Trailer can save you—and that twenty seconds can mean the difference between profit and loss on a closely-bid contract.

PD20s can take on a 25 cu. yd. load, haul at speeds up to 34.2 MPH, cast their entire load, to the side, over steep fills or banks *without stopping!* This non-stop dumping cycle is where you save your twenty seconds—and if you don't think a twenty-second saving is worthwhile, figure it out for yourself in the space at left. You'll see how twenty seconds can mean your profit.

Ask your Athey-Caterpillar Dealer to show you how the Athey side-dump principal gives you non-stop production and profits. Just give him a call or write direct.

FIGURE IT YOURSELF . . .

Multiply 20 (seconds a PD20 can save on each cycle) X_____ (number of hauling units on your job) X_____ (number of round trips each unit makes per hour) X_____ (number of hours you work each day) X_____ (number of work days estimated in your contract). Divide your answer by 3600 and you see how many *hours* Athey PD20s could save on *your* job!

Athey

PRODUCTS CORPORATION

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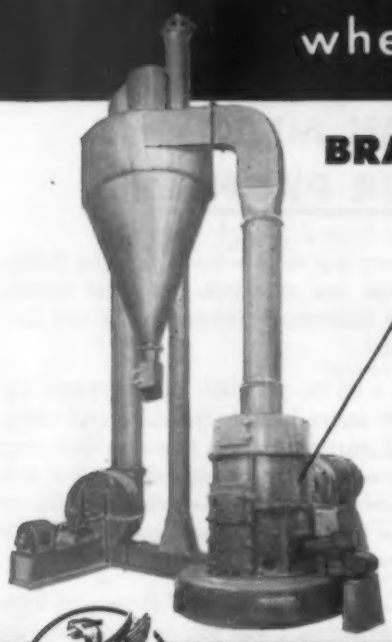
An Athey PD20 Side-dump Trailer dumps a 25 cu. yd. load of mixed material over a spoil bank. The dirt is cast away from the wheels as the rig keeps on the move. Patented hydraulically-controlled stabilizing system assures stability, even on dump!

when *fine* grind is desired



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The ONLY pneumatic roller mill installed at floor level.

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425 CUBIC YARDS DAILY

FROM A 50' MACHINE

A high output rate is vital when you want to sell the growing market for Lightweight Aggregate. The Dwight-Lloyd sintering machine gives you consistently high quality aggregate at a greater output rate than can be obtained by any other process—a Dwight-Lloyd plant using a standard model machine with a 50' hearth length has a nominal capacity of 425 cubic yards per day.

When facilities for greater output are required, additional sections can be added to the machine at a fraction of the original cost, up to a capacity of 1000 cubic yards per day.

Dwight-Lloyd machines can be operated continuously or intermittently without loss of efficiency, waste of material, or stand-by and restarting costs. Fuel consumption is 2/3 less than with any other process. Operation is automatic, requiring a minimum of skilled labor.

Dwight-Lloyd, Inc., has complete facilities for designing and constructing your entire plant. We also offer the services of our modern pilot plant to test your materials.

For complete information write for Bulletin 151

DWIGHT-LLOYD, Inc.

DIVISION OF SINTERING MACHINERY CORPORATION

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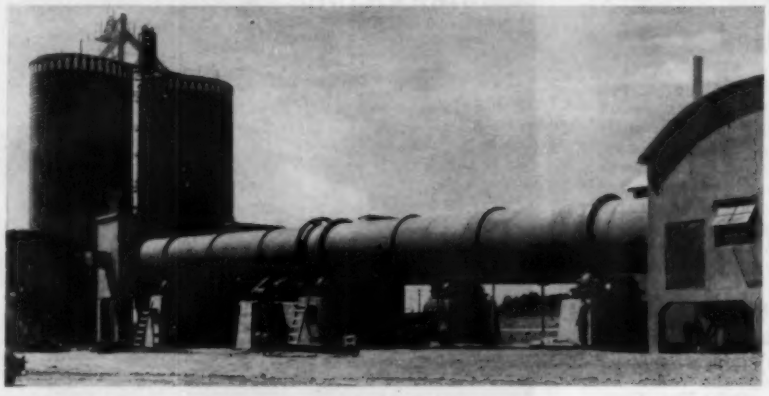
DEPENDABLE KILNS, COOLERS, DRYERS—ANY SIZE SINGLE OR MULTIPLE INSTALLATIONS—GO WEBB



Here are two Kilns 8′ diameter x 125′ long at the Buildex, Inc. plant, Ottawa, Kansas, used for making Light Weight Aggregate. They also have two Rotary Coolers 5′ x 6″ diameter x 50′ long, that work with the Kilns.

The WEBB Corp., pioneering heavy industrial equipment since 1881, is strategically located; well staffed with consulting engineers, skilled mechanics and modern equipment.

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1081

SCREENING NEWS

Helpful information on screening and separating operations ...from field reports of **SWECO SEPARATOR** *District Engineers*

Replacement costs reduced through screen rotation

Hawaii customer using SWECO vibrating screen separator to screen abrasive blasting rock found during their preliminary run that because their material (lava rock) was highly angular and sharp, the screen cloth was subjected to excessive wear at the discharge spout. SWECO engineer suggested a 45 degree rotation of screen cloth every three days to alternate area receiving abrasive brunt. Results: Longer screen cloth life . . . Lower replacement cost.

98% Screening Accuracy on sized grades of Silica Sand

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Disodium Phosphate through 48-Mesh Cloth at 20 TPH

Recently a Midwest chemical firm called SWECO on two screening problems. Problem #1: screen blinding on disodium phosphate, weighing 30 pounds per cubic foot. Problem #2: 20 tons per hour through 40-mesh cloth needed; capacity of 12 conventional rectangular screening units, unsatisfactory. Solution for problem #1: a SWECO unit, fitted with 48-mesh tensile bolting cloth, plus anti-blinding rings, completed a successful test run of 28 hours continuous operation without blinding. Recommendation for problem #2: *two* 48" diameter SWECOS to handle well above the 20 TPH needed throughput.

Free screening analysis and recommendations . . .

SWECO *District Engineers are available to make detailed analyses and recommendations on specialized screening operations without cost to you.*

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Detailed information on applications of SWECO *Screen Separators.*

SWECO SEPARATORS

SOUTHWESTERN ENGINEERING COMPANY

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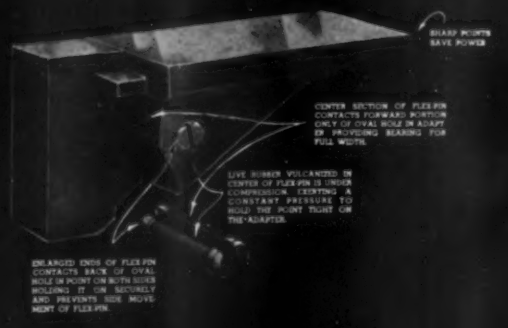
Engineers and Constructors . . . Manufacturers

Teeth that really Dig!

WITH THE *Positive Locking* FLEX-PIN CONNECTION


SHARP POINTS SAVE POWER
CENTER SECTION OF FLEX-PIN CONTACTS FORWARD PORTION ONLY OF OVAL HOLE IN ADAPT. BY PROVIDING BEARING FOR FULL WIDTH.
LIVE RUBBER VULCANIZED IN CENTER OF FLEX-PIN IS UNDER COMPRESSION CREATING A CONSTANT PRESSURE TO HOLD THE POINT TIGHT ON THE ADAPTER.
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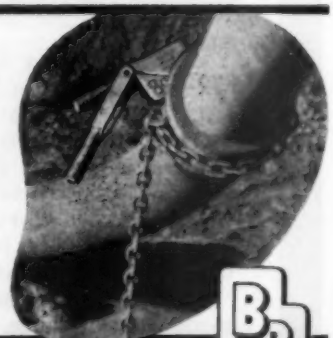

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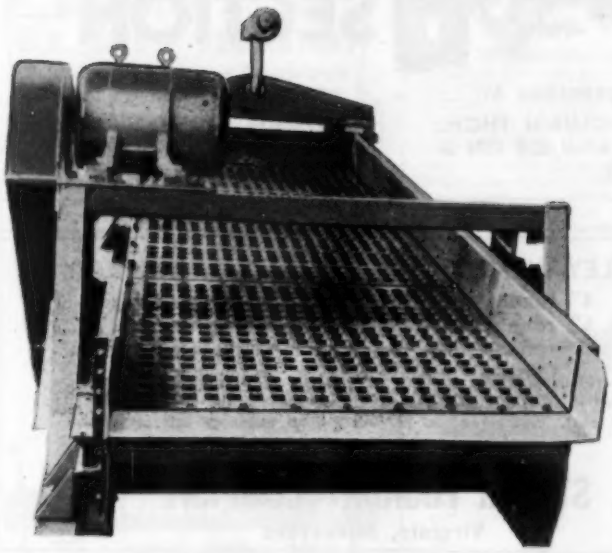

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3 Phase, 60 Cycle, 220 or 440 Volts (*2300 volts, or higher)

H.P.	Make	Type	Speed
2000	*G. E.	MT-12	600
1500	*G. E.	MT-30	240
1250	*Westg.	CW	600
1000	*Westg.	CW	250
800	Al.-Ch.	ANY	600
700	*Al.-Ch.	ANY	720
600	*G. E.	MT-422	600
500	*Al.-Ch.	ANY	600
500	Westg.	CW	350
400	Al.-Ch.	3-brg.	450
400	*G. E.	MT-412	450
300	*G. E.	IE-15A	1800
300	*G. E.	MT-410	450
250	Westg.	HF-15H	600
200	*Westg.	CW	1200
200	G. E.	IK-15B	900
200	G. E.	IM	600
150	Cr. Wh.	50-R	1800

WE'LL SELL, BUY OR TRADE

PHONE CANAL 6-2900

CHICAGO *Electric Co*

1329 W. CERMAK ROAD
CHICAGO 8, ILL.

MINE AND SLOPE HOISTS

1—20,000# Allis-Chalmers, Dbl Drum
1—26,000# Nordberg, Sgl Drum
1—26,000# Vulcan, Sgl Drum AC with MG Set Complete
1—11,000# Wellman, Sgl Drum AC
1—16,000# Allis-Chalmers, Sgl Drum
1— 7,000# Ottumwa, Sgl Drum AC

CARPULLERS AND LOADERS

1— 5,000# Jeffrey Carspotter AC
1— 6,000# Brownie Carspotter AC
1— 5,000# Link-Belt Carspotter AC
1—20,000# Amer. Hoist Carspotter AC
1—20,000# LB Endless Puller

CRUSHERS AND MISC.

1—36x36 Jeffrey Sgl Roll
1—12x16 Eagle Dbl Roll
1—18x20 Eagle Dbl Roll

6336 N. California Ave.
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HAWKINS & COMPANY

TELEPHONE BRIARGATE 4-8607

FOR SALE

1 Bucyrus Erie 27T Blast Hole drill Serial No. 19574, with Caterpillar D-3400 power unit, and spare parts.

3 2′ x 5′ "Selectro" Single Deck Vibrating Screen, new in original crates, with "V" belt drives.

LOUISVILLE CEMENT CORP.

SPEED, INDIANA

BUCKET LOADER

1 - Barber-Greene model 82A heavy duty Bucket Loader with Buda gas motor. Has been used for travel plant operation. Good condition. — CONTACT:

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BONDED QUARRY EQUIPMENT

WRITE, WIRE OR PHONE. IMMEDIATE SHIPMENT FROM STOCK

NEW TROUGHING IDLER CONVEYORS

COMPLETE READY-FAB SECTIONS QUICKLY AND EASILY JOINED TOGETHER ON THE JOB. We take our loss on our stock of short length belting. You can save as much as 50% on the BONDED CONVEYOR SPECIALS listed with conveyor belting in two pieces. Conveyors are equipped with 5" roll diam. idlers and return rolls, 20" diam. head pulley and 16" diam. tail pulley mounted on 2-7/16" diam. shaft. Belt is new 4-ply, 28 oz. duck, ¼" top rubber cover x 1/32" bottom cover and is fresh stock made by leading manufacturers.

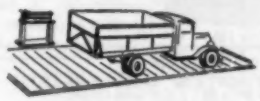
Remember You Save Up to 50%

Belt Width	Length of Conveyor	List Price	Sale Price
18"	25′	$1229	$ 658
18"	45′	1839	960
18"	85′	3209	1581
18′	100′	3704	1814
24"	25′	1322	739
24"	45′	2062	1085
24"	100′	4097	2037
24"	130′	5207	2606
30"	25′	1421	806
30"	65′	3101	1617

Any length, any belt width at bargain prices.

NEW MOTOR TRUCK SCALES

For stationary and portable applications. Scales have steel lever system complete with structural steel weighbridge. Capacities to 50 tons. Recording beams available.



20 Ton Truck Scales	$525.00
26 Ton Truck Scales	582.00
33 Ton Truck Scales	825.00

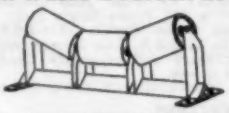
NEW CONVEYOR BELTING

Heavy duty rubber belting having high tensile strength, tough cotton duck, strong carcass and proper flexibility. For heavy boxes, bags and bulk materials. Troughs easily. Famous brands at deep cut prices. Fresh stock.

Width	Ply	Top Cov.	Bottom Cov.	Duck Carcass	Price
16"	4	1/16"	1/32"	28 oz.	$2.45/ft.
18"	4	1/16"	1/32"	28 oz.	2.50/ft.
24"	4	1/16"	1/32"	28 oz.	3.23/ft.
30"	4	1/16"	1/32"	28 oz.	3.97/ft.
20"	5	3/32"	1/32"	28 oz.	3.95/ft.

Additional widths and plies available at low prices. Write for free sample.

NEW IDLERS & RETURN ROLLS



3-roll, 5" diameter Troughing Idlers for

16" belt	$17.25	24" belt	$18.75
18" belt	18.00	30" belt	19.50
20" belt	18.25	36" belt	20.25
4" belt	21.75		

1-roll, 5" diameter Return Idlers for

16" belt	$6.75	24" belt	$7.50
18" belt	7.13	30" belt	8.25
20" belt	7.30	36" belt	8.75
48" belt	10.25		

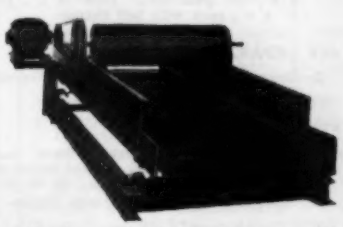
All steel. Interchangeable with other well-known makes. Replaceable ball bearings. Either sealed type (pre-lubricated) or with alemite fittings. Rust proof ball races. Maintenance is negligible.

NEW HEAD AND TAKEUP PULLEYS

All welded steel head and tail pulleys and assemblies complete.
Priced from $60.00

BONDED HEAVY DUTY VIBRATING SCREENS

For Continuous, Economical Screening of High Tonnages



For all minerals, chemicals and industrial products. To size, grade, clean and separate solids from liquids. Heavy duty models are 4-bearing, positive throw eccentric shaft type, 3′ x 8′ to 5′ x 14′, 1 to 5 decks. Other models have eccentric weight mechanism, spring mounted; 1 to 3 decks; from 2′ x 4′ to 3′ x 8′. All models low priced, with minimum maintenance and power consumption.

Heavy Duty prices from..... $1095.00 General Purpose prices from..... $431.00

More than 4000 mines and quarries have modernized with Bonded equipment.

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Mfrs. of Scales, Conveyors, Conveyor Parts, Idlers, Vibrating Screens, Crushers and Feeders
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Koehring Dumptors, good tires, rebuilt last winter, equipped with GM 471 Diesel Engines, new electric systems, all ready to work.

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GRUNER ROTARY BITS IN STOCK

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where we shall continue our 37 years of service to you.

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8—6′ x 40′, 5′ x 40′ Ruggles-Coles; 54″ x 25′ Class Xf-4 Ruggles-Coles, also 3—3′ x 50′, 5′ x 50′, 6′ x 60′, 7′ x 70′ Direct Heat. Also 3—6′ x 50′ Louisville Rotary Steam Tube.

3—Link Belt Roto Louvre Dryers—#207-10 (2′7″ x 10′); #502-16 with all stainless steel contact parts; #604-20.

3—3′ x 50′ (or Coolers) made by Bonnot Co., Canton, Ohio.

ROTARY KILNS:

1—6′ x 120′ Vulcan Rotary Kiln.

CRUSHERS:

Jaw—2″ x 6″, 6″ x 15″ Sturtevant, 18″ x 36″ and 24″ x 36″ Farrel; 42″ x 48″ Traylor; Rolls; 42″ x 16″ Allis Chalmers Type B; 24″ x 32″ Penna Single Roll. Portable Plants; Cedar Rapids 1036-BBB; 2540-AAAA, 2036-AA, Also Pioneer with 30″ x 42″ primary and secondary Crushers. all Diesel driven.

PULVERIZERS:

1—#5047 Raymond High Side Mill.

2—#6669 Raymond Super Mills

6—#1, #0, #00, #000 Raymond Mills.

3—#0, #00, 8″ Raymond Screen Mills

2—#51 Raymond Imp. Mills

3—Mikro #4TH, #2TH, Bantam SH

BALL AND TUBE MILLS:

6—Hardinge Mills, 3′ x 8″, 5′ x 22″, 6′ x 22″, 8′ x 48″.

4—Tube Grinding Mills, Made by Traylor, E. & M. Co. Allentown, Pa. Silex Lined, 4″ x 13′, 4′6″ x 18′6″, 5′ x 22′ and 5′ x 20′.

8—Pebble Mills, porcelain lined; 3—6′ dia. x 8′, 800 gals. each. 1—6′ x 5′, 3—5′ x 4′, each with ball charge.

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2—Raymond 6′ x 16′ dia.; 1—8′ Gayco; 1—8′ Sturtevant.

FILTERS:

3—#12 Sweetland Pressure Filters, each with 48 bronze Monel covered leaves on 3″ C.C., ea. 642 sq. ft. f.a., 56 cu. ft.

All sizes Oliver Rotary Vacuum Filters.

Only a Partial List.

Send us your inquiries for Shovels, Cranes, Draglines; Jaw Gyratory and other Crushers; Symons and Telsmith Cones; complete Portable Crushing Plants; Rotary Kilns and Coolers; Air Compressors, Conveyors and FULL LINE OF CHEMICAL PROCESS EQUIPMENT.

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Lima 603 Crawler Crane-Dragline, 1½ cu. yd. rated capacity, S/N 1064; with fairlead and tagline; equipped with D-13000 Caterpillar Engine; Vacuum Boosters; 90′ boom; 32″ x 13′ pads; extra heavy counterweight; machine weight, 94,000 lbs.

SEE TO APPRECIATE

READY TO WORK - PRICE: $12,500.00 loaded car.

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12—304 HP Kewanee Firebox Boilers, Model 590, 125 PSI, with oil burners & soot blowers, ASME.
4—150 HP, HRT Boilers, 150 PSI, gas fired, ASME.
1—60 HP, Titusville, 150 PSI.

CRUSHERS

18″ x 36″ Jaw, Traylor, Bulldog.
14″ x 16″ Bartlett & Snow, 2 roll.
48″ Symons, vert. disc.
42″ x 14″ Traylor, 2 roll.
28″ x 24″ Williams Impact Crusher.
18″ x 18″ Jeffrey, single roll.
42″ Raymond, 3 roll, high side.
50″ Raymond, 5 roll, high side
Raymond #1, double whizzer, complete.

BUCKET ELEVATORS

6—20′-31′ cc., 6″x4″ to 8″x6″ buckets.
1—44′ cc., 15″ x 12″ buckets.
1—50′ cc., 8″ x 5″ buckets.
3—35′-45′ cc., 12″ x 6″ buckets, Centrifugal.
2—40′ cc., 6″ x 4″ buckets, Centrifugal.
1—42′ cc., 42″ x 18″ buckets, Continuous.

KILNS—COOLERS—DRYERS

9′ x 80′ x 5/8″ Allis Chalmers.
8′ x 125′ x ¾″.
7′ x 140′ x 5/8″ (2).
7′ x 120′ x 5/8″ (2).
7′ x 45′ x 1/2″ Link-Belt.
5′ x 67′ x 5/16″.
5′ x 30′ x ¾″ Ruggles-Cole.
4′6″ x 50′ x ¼″ with lifters.
4′ x 30′ x 3/8″.
310-16 Roto-Louvre.

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4′ x 10′ Seco, double deck.
4′ x 7′ Tyler-Hummer, single deck.
3′ x 8′ Link-Belt, double deck.

MISCELLANEOUS

14″ x 13″ Worth. Compr., 628 CFM, 100 PSI.
No. 3 Clyde Lime Hydrators.

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VIBRATING SCREENS FOR SALE

1—4′x16′ Pioneer Mesabi Type Tandem Vibrating Screen consisting of 2—4′x8′ Two deck units all mounted on common frame.

2—5′x12′ Two Deck Pioneer Mesabi Type Vibrating Screens.

Above equipment now available in Chicago district at bargain prices.

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42″ x 14′ Heavy Duty Cedar Rapids apron type feeder, used less than 1 year, completely rebuilt.
F.O.B. Lexington, Ky. **$4,750.00**

3′ SYMONS SHORT HEAD CONE CRUSHER
(used—15 months) complete with 75 H.P. 1200 RPM T.E.F.C. Electric motor and "V" belt drives.
F.O.B. Gilbertsville, Ky. **$11,500.00**

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Pneumatic Tired, Gasoline Power, has been on rent less than 3 months.
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WILSON MACHINERY AND SUPPLY CO.

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FOR SALE
International TD-24 Tractor s/n TDE 2546, Equipped with Bucyrus Erie Cable Angle Dozer and Bucyris Erie DDPCU. Only 1889 Hours on meter. Asking $16,000.00.

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140 HP DIESEL ENGINE

Rebuilt 140 HP Waukesha-Hesselman Diesel engine, complete power unit with radiator, clutch, elec. starting, size 6½x6¼", with number of spare parts. All mtd. on skids. Located Chicago. $900.00. Must be seen to be appreciated.

CAR PULLERS

Mead Morrison drum type, 7½ HP and 15 HP, 3/60/220, 4200# to 15,000# linepulls.

CRANES, CRAWLER

¾ yd. Mdl. 255A P&H Crane, Ser. 8243, gas engine, 30-40' boom.

Mdl. 501 Koehring #1071, 60-70-80' boom, 18' jib, Mdl. K Wisc. gas eng., cap. 20 ton @ 12'.

1½ yd. Lorain Mdl. 77 Diesel Crane, Ser. 9163, D-13000 Cat. eng., 45' to 85' boom, 20' jib.

1½ yd. P&H Mdl. 655-A Diesel Crane or Dragline, Ser. 6426, 80' boom, 20' jib, Cat. D-13000 eng., hi gantry.

1½ yd. Mdl. K360 Link Belt, Ser. 1959, Cat. D-13000 Diesel, 80' boom, very low priced for a good 1½ yd. crane.

1½ yd. Mdl. 78 Loraine Diesel, Ser. 11281, 150 HP Cat. Diesel, 70-100' boom, sacrifice price.

CRANES, LOCOMOTIVE

30 ton Mdl. F OHIO #3266, 50' boom, oil fired, Nat'l. Bd. 200# boiler.

DERRICKS, GUY & STIFFLEG

30 ton Wiley Mdl. F Steel Stiffleg, 60-80- or 100' boom; rated with 60' boom 30 ton @ 38' or 15 ton @ 57'.

25 ton Wiley Mdl, E Steel Stiffleg, cap. 25 ton with 60' boom.

20 ton American Terry Steel Erectors Guy Derrick, 110' mast, 100' boom.

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9½x12 Lambert 2/drum steam hoist w/o boiler, modern heavy duty frictions installed. 6 ton at 175 FPM. Sacrifice at $1,250.00.

12 x 12 3/drum Lambert-National, 20,000# single line, like new with steel gears & 2 clutch winch heads.

11x12 3/drum American, steel gears, 2 clutch winch heads, rated 15,000# single line.

Lambert steam hoists—2/drum, sizes 8½x10, 9x10, 10½x12.

8¼x10 2/drum, 9,000# single line, American, Clyde & Lidgerwood.

Partial list only — Please let us quote on your requirements.

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1—Brookville—24" Ga.—Gas $3042.
2—G.E. 25 Ton Diesel Electric.
2—Plymouth 3 Ton Gas Std. Ga.
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1—Whitcomb 30 Ton S.G. Diesel 240154—almost new.
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8—Koppel 30 Yd. Air Dump—Lift Doors.
21—15 Ton Hopper 36" Ga.
2—Unusually nice 50 Ton Twin Hoppers Cross Dump.

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2—Conway 75 Muckers—$250 & $95. Large Number. New Repair Parts. Very Cheap.
Bridgeford Axle Lathe.
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Mundy 2 Drum Elec. Hoist—300 H.P.
Browning 25 Ton Revolving Gantry, 230 D.C.
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Orton 15 Ton Diesel Loco. Crane—$12852.

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Schield-Bantam "M49" ⅝ yd. Trench Hoe, mounted GMC 6x6 Truck.
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Insley "K12" ½ yd. Used Trench Hoe.
Osgood "200" ½ yd. Trench Hoe.
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Jaeger 2 yd. Hi-Discharge Transit Mixer (1948) mounted White 1946 WA20 Truck.
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Diamond "1536" R. B. Jaw Crusher.
Caterpillar "D8800" Used Diesel Power Unit.
Haiss "75-W" Bucket Loader, 1950 Model, Rubber-Tired.

Note: This equipment is in our yard or within 40 miles.

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- Enclosed 20" bucket elevator 75', Super capacity
- Continuous 14" and 12" bucket elevators
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- Bonnot double roll crusher, 24" dia. 30" face
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- Sturtevant 00 Fine crusher with 2 hp motor
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- Hummer vibrating screens, type 31 and 37
- Selectro enclosed single deck 4'x6' vibr. screen
- New Universal Vibrating Screens
- Revolving screen, 5'x20'
- Conveyor idlers and parts, 14"x42"
- New and used conveyor belt to 36"
- Jaw crushers and Hammermills
- Gear reducers, motors, and gearmotors

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SPECIAL OFFERING

1—P. & H. ½ yard shovel in good condition $6,000.00

1—Factory rebuilt 14 x 26 crusher.

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HARDINGE 3'x8", 5'x22", 5'x36", 6'x22", 8'x22", 10'x36" & 10'x48".
BALL MILLS 3x7, 5x4, 5x14, 5x18, 6x6, 6x7, 6x8, 6x10, 6x12, 7x5, 7x6.
ROD MILLS 3x10, 4x7, 5x10, 5x14 & 6x12.
TUBE MILLS, 5x18, 5x22, 5½x20, 6x8 & 6x22.

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HERCULES JUNIOR 3 ROLL MILL.
1 & 3 RAYMOND AUTOMATIC.
35" RAYMOND VERTICAL MILL.
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6'x14' HARDINGE COUNTER CURRENT.
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PENNSYLVANIA: 8XC-15-58, 8XT-11 & 13.

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DOUBLE SHELL: 60"x35' & 90"x60' & 5'x30'.
SINGLE SHELL: 3'x26', 4'x20', 6'x40', 6'x50' & 6'x60'.
KILNS: 6'x60', 6'x80', 8'x125' & 10'x125'.

JAW CRUSHERS
BLAKE TYPE—40x48, 42x48, 30x36, 24x36, 18x36, 13x30, 12x24, 12x16.
SINGLE SHAFT—18x36, 15x36, 15x30, 10x40, 10x30, 10x20.
CAM & ROLLER—24x40, 14x26, 11x26, 10x20, 6x20.

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NEWHOUSE 7", 10", 14"—KENNEDY 198, 238, 37—SUP. McC. 6" & 10" AL. CHAL. 322R, 222R, 530R, TRAYLOR TY 36".

GYRATORY STD. PRIMARY CRUSHERS
6", 10", 14", 20" & 36" SUP. McC.—GATES AL. CHAL. 3, 4, 5, 6, 7½, 8, 9, 12.
PARTS FOR 42" SUPERIOR McCULLY.

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1—70 Ton & 3—45 Ton G.E. Diesel Elec.
10 Ton DAVENPORT & 25 Ton Plymouth Gas.

LOCOMOTIVE CRANE
30 TON INDUSTRIAL BH, GAS. 70 FT. BOOM.

60 FT. CRANE BOOM
1—60 Ft. Latticed Steel Crane Boom. $500.

MERRICK WEIGHTOMETERS
7—42 In. 30 In. 24 In. 18 In.

STEEL DERRICKS
GUY: 8 TON 85 FT. BOOM, 25 TON 60 FT. BOOM, 15 TON 100 FT. BOOM, 20 TON 115 FT. BOOM, 50 TON 100 FT. BOOM.
STIFF LEG: 5 TON 70 FT. BOOM, 15 TON, 100 FT. BOOM, 25 TON 100 FT. BOOM, 75 TON 135 FT. BOOM, 1—5 TON 100 FT. BOOM.

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15—8,000, 10,000 & 20,000 GAL. CAP. WITH COILS. —6—10,000 GAL. R.R.

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420 & 676 WORTHINGTON BELTED.
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TO LICK the really rough ones *on schedule*, mount U. S. Royal Nylon Con-Trak-Tors on your equipment.

ALL-NYLON STRENGTH

The Con-Trak-Tor's Nylon cord carcass *won't quit* under vicious shocks and jolts. You're sure to get all the long service life built into this great tire.

TRIPLE IMPACT PROTECTION

1. *Extra rubber* between cord plies. 2. *Double shock-pads* beneath the tread. 3. *Built extra-tough at the crown* to withstand snags and rocks.

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The Con-Trak-Tor's *full-width* lug design pulls you through where others bog down, won't strand you in heavy going, gives *extra* protection from side-slip.

Talk the Con-Trak-Tor over with your U. S. Royal Dealer. He can equip you with the size you need for the job you want to get done!

Tough Jobs Get Done ...on NYLON!

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FARVAL—*Studies in Centralized Lubrication* No. 147

Farval helps crush flinty titanium ore for improved paints

DEMAND for paint keeps this crusher busy on titanium-bearing iron ore. After processing, the titanium is converted into a pigment which gives paint a more opaque, better covering quality.

Crushing flinty-hard titanium ore imposes such strains on bearings that unless they are lubricated properly at all times costly shutdowns may result. To insure that the crusher would stand up well under all load conditions, the builder installed a Farval system of centralized lubrication.

No matter how protracted and tough the working conditions, Farval does the job dependably, lubricating all points at fixed intervals with the correct amount of grease. Since Farval works while the crusher is in operation, there are never any shutdowns for greasing—never a bearing missed. And because Farval is a self-enclosed system, abrasive dust cannot sift into bearings to cause trouble.

Farval delivers any oil or grease that can be pumped under pressure to a group of bearings from one central station, in exact quantities, as often as desired. Farval—the original Dualine system with Positive Piston Displacement Valve has but two moving parts and is fully adjustable. Experience shows that Farval saves up to 45 minutes of each hour of oiling lal or—up to 3 of every 4 pounds of lubricant used by other methods. Write for Bulletin 26 for a full description of Farval. The Farval Corporation, 3280 East 80th Street, Cleveland 4, Ohio.

Affiliate of The Cleveland Worm & Gear Company, Industrial Worm Gearing. In Canada: Peacock Brothers Limited.

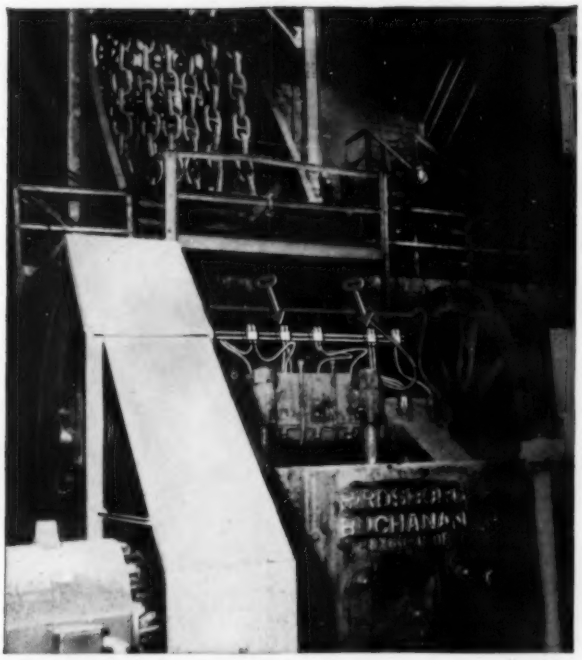

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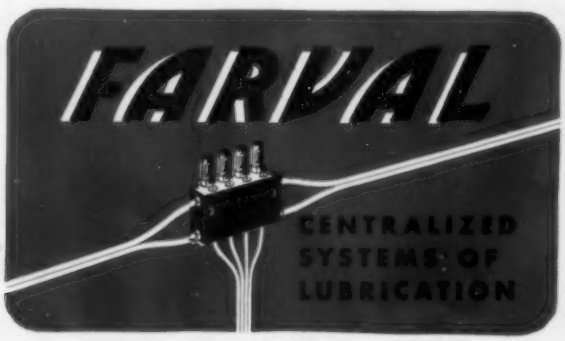
Photo shows Farval-equipped 48" x 60" Birdsboro-Buchanan deep frame crusher in an eastern titanium processing plant.



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More than 500 million pounds of Texaco Marfak have been sold

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Let a Texaco Lubrication Engineer help you get top efficiency from all your equipment. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

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